FURLEY HAZARDOUS WASTE LANDFILL

MEETING

BEFORE THE

SUBCOMMITTEE ON NATURAL RESOURCES,
AGRICULTURE RESEARCH AND ENVIRONMENT

OF THE

COMMITTEE ON
SCIENCE AND TECHNOLOGY
U.S. HOUSE OF REPRESENTATIVES

NINETY-EIGHTH CONGRESS

FIRST SESSION

JULY 30, 1983

[No. 61]

Printed for the use of the
Committee on Science and Technology

U.S. GOVERNMENT PRINTING OFFICE
29-271 O WASHINGTON : 1984

H701-35

COMMITTEE ON SCIENCE AND TECHNOLOGY

DON FUQUA, Florida, *Chairman*

ROBERT A. ROE, New Jersey
GEORGE E. BROWN, Jr., California
JAMES H. SCHEUER, New York
RICHARD L. OTTINGER, New York
TOM HARKIN, Iowa
MARILYN LLOYD, Tennessee
DOUG WALGREN, Pennsylvania
DAN GLICKMAN, Kansas
ALBERT GORE, Jr., Tennessee
ROBERT A. YOUNG, Missouri
HAROLD L. VOLKMER, Missouri
BILL NELSON, Florida
STAN LUNDINE, New York
RALPH M. HALL, Texas
DAVE McCURDY, ~~Okl~~ahoma
MERVYN M. DYMALLY, California
PAUL SIMON, Illinois
NORMAN Y. MINETA, California
RICHARD J. DURBIN, Illinois
MICHAEL A. ANDREWS, Texas
BUDDY MacKAY, Florida
TIM VALENTINE, North Carolina
HARRY M. REID, Nevada
ROBERT G. TORRICELLI, New Jersey
FREDERICK C. BOUCHER, Virginia

LARRY WINN, Jr., Kansas
MANUEL LUJAN, Jr., New Mexico
ROBERT S. WALKER, Pennsylvania
WILLIAM CARNEY, New York
F. JAMES SENSENBRENNER, Jr., Wisconsin
JUDD GREGG, New Hampshire
RAYMOND J. McGRATH, New York
JOE SKEEN, New Mexico
CLAUDINE SCHNEIDER, Rhode Island
BILL LOWERY, California
ROD CHANDLER, Washington
HERBERT H. BATEMAN, Virginia
SHERWOOD L. BOEHLERT, New York
ALFRED A. McCANDLESS, California
TOM LEWIS, Florida

J. H. Poore, *Executive Director*
Robert C. Ketcham, *General Counsel*
Regina A. Davis, *Administrator*
David S. Jeffery, *Minority Staff Director*

Subcommittee on Natural Resources, Agriculture Research and Environment

JAMES H. SCHEUER, New York, *Chairman*

TIM VALENTINE, North Carolina
TOM HARKIN, Iowa
MICHAEL A. ANDREWS, Texas
BUDDY MacKAY, Florida
ROBERT G. TORRICELLI, New Jersey
GEORGE E. BROWN, Jr., California

RAYMOND J. McGRATH, New York
CLAUDINE SCHNEIDER, Rhode Island
ROD CHANDLER, Washington
TOM LEWIS, Florida

CONTENTS

WITNESSES

July 30, 1983:

Page
- Ben Foster, Kansas State Representative ... 12
- Peter Vardy, vice president for environmental management, Waste Management, Inc., accompanied by Donald Walgren, director, environmental waste management; Fred Roberts, vice president, Waste Management of North America; Dave Hendren, Woodward-Clyde, consultants ... 13
- Sharilyn Dienst and Mike Everhart, Sedgwick County Health Department ... 62
- Barbara Sabol, secretary, health and environment for the State of Kansas; Robert Vinson Eye, assistant attorney general, Wichita, Kans.; and Robert L. Morby, Chief, waste management branch, region VII, Environmental Protection Agency ... 117
- Janis Butler, National Society of Professional Engineers, environmental policy task force ... 162
- Dr. J. R. Berg, professor of geology, Wichita State University ... 172
- Frank Wilson, senior geologist, Kansas Geological Survey and adjunct professor of geology, University of Kansas ... 189

Appendix: Additional material submitted for the record ... 239

FURLEY HAZARDOUS WASTE LANDFILL

SATURDAY, JULY 30, 1983

House of Representatives,
Committee on Science and Technology,
Subcommittee on Natural Resources,
Agriculture Research and Environment,
Wichita, Kans.

The subcommittee met, pursuant to call, at 9 a.m., in the City Library Auditorium, 223 South Main Street, Wichita, Kans., Hon. James H. Scheuer (chairman of the subcommittee) presiding.

Present: Representatives Scheuer and Glickman.

Mr. Scheuer. This hearing of the Subcommittee of the Science and Technology Committee on Natural Resources, Agricultural Research and Environment, will now come to order.

I'm Congressman James Scheuer of New York and I'm chairman of the subcommittee, and at my left and to your right is Congressman Dan Glickman of Kansas, a very hard working, thoughtful, and involved member of the subcommittee from the State of Kansas. And we are here today to look into the matter of the Furley landfill with which all of you, and certainly Congressman Glickman, are far more familiar than I, but let me just take a moment to set this all in context.

Our committee, which is in charge of EPA research, as well as research of the National Oceanic and Atmospheric Administration, started looking into this business of landfills and toxic waste dumps last year, and we became very concerned as the evidence mounted that there were—there were between 15,000 and 50,000 toxic waste dump sites around the country, and as evidence mounted that these toxic waste dump sites could be far more toxic than anybody thought and that the costs of remedying the damage, remediating the damage, could be far more frustrating, difficult, complicated, and costly than anybody had conceived possible.

We still don't have a lot of the answers. What we do know is that the treatise from American's post-industrial society, from the chemical amenities to make life more pleasant, and in some cases more healthful and more salubrious themselves constitute a threat to our comfort, our convenience, our health, and sometimes to our very lives.

Only the last 6 months—only in the last 6 months has the evidence developed of the incredible toxicity of a chemical called dioxin, which is an unwanted waste byproduct of the manufacturer of herbicides, which first came to our attention during the Vietnam war when we were spraying that benighted subcontinent with agent orange, and as a matter of fact, just in the last couple of days, this very week while the debate was going on on the floor of the House about our involvement in Central America, we were having hearings of our committee on agent orange with representatives of the Veterans' Administration who are now studying the health impact on the health and life prospect of the veterans who were involved in the use of agent orange during that tragic period in our history.

We have developed knowledge of levels of toxicity that we never dreamed of before. We know that an infinitesimal fraction of one drop of dioxin in an Olympic swimming pool will make that pool toxic to laboratory animals. We know that 1 part in 1 quintillionth is the maximum acceptable and supportable concentration of dioxin that is tolerable in water, 1 part in 1 quintillionth. That is 1 followed by 18 zeroes. That is 1 billion billion.

Now, up until very recently it had been thought that 1 part or 2 parts in a billion was acceptable and now we find that that's cut to 1 part in 1 billion billion. So apparently our tolerance of dioxin is one-billionth of what we thought it was only a couple of months ago. So we are going to have to stick with this problem of how we continue progress in our society, how we harness the best means in our society, in the universities, in the medical schools, in the various Government agencies, in the National Institutes of Health, in the Center for Disease Control in Atlanta, and last but certainly not least, in the chemical industry itself.

The chemical industry may be part of the problem now. The Dow Chemical Co. may be spewing dioxin into the Titabawasse [sp.] River this very minute, this very hour, this very day, while the Federal scientists from the EPA are without the right even to enter into the plant gates and examine the discharge that is flowing daily into that river, dioxin-laden as it no doubt is, but nevertheless, there is a great deal of talent in the Dow Chemical Co. and the Monsanto Chemical Co., and in the chemical industry throughout our land that ought to be harnessed to the problem that they as producers and we as consumers have jointly created.

We are all in this together and I hope that out of subsequent hearings, which Danny and I will try to provide some continuing leadership, we'll evolve with the top officials of Government and with the leadership of the Chemical Manufacturers Association in Washington that is really keen on doing something useful and constructive. We will involve some kind of joint attack on this problem that will bring in all of the brains in our society, including the enormous talent that is in the industry that have produced these chemicals that have so benefited us in so many ways, but which now it becomes apparent have unfortunately and unbeknownst to us all these years have also produced some very toxic byproducts.

So to place this hearing in a continuum, our subcommittee is trying to evaluate the evidence that is literally bursting on the scene in the last several months of what is happening to our society and what price we are paying, and to what dangers we are subject to, and to what extent is human health being threatened by the production of toxic wastes in our society.

How do we cope with them? How do we dispose of them and how do we—how do we cope with the toxic-dump sites that are already there, how do we recycle them? How do we approach the question of the liners, which is a subject that we'll be discussing this morning? How do we—what do we make of the fact that the evidence seems to be accumulating, that there is no such thing as a sound and reliable liner, that all liners after a period of time seem to give way to cracks and leaks, and that it is only a question of time before the liners begin to pollute the very land on which they sit.

What is the cost of clearing these dumps going to be, and what is the—what is going to be the added cost in the future of recycling the toxic wastes of the chemicals that our society wants, and needs, and benefits by, and how do we pay for it?

Some of us have been talking for many years about a tax that would be added to the cost of these chemicals in the first place, to provide for their ultimate recycling, but society is going to have to engage in a great deal of cerebral thought, a great deal of very creative thinking from the grassroots level on up, and it's this process that Danny and I are engaged in now, and will be engaged in, I suppose, for many months and several years to come. We have had hearings of this kind of toxic dump sites and the perplexing questions that flow from them, in Florida, California, in New Jersey, and now Kansas, and we'll be out in the State of Washington in the fall trying, and in a painful way, in a painfully difficult subject to comprehend, to add to our knowledge and our understanding of this incredibly complex set of forces that has produced this problem, and the even more incredibly complex problems of how we remedy the damage that's already been done.

It's been said by somebody wiser than I that we are not the owners of this planet, we inherited it from our forefathers, we have borrowed this planet and we are going to give it, where it rightfully belongs, to our children and grandchildren. The question is, what do we give them and how proud will we be of what we give them, and how proud will they be of us, of the planet that we give them, in the generations to come.

Danny and I are doing our best to involve you, the people, and get your best thinking as to the—as to the way out. We don't expect to come up with any hard answers this morning but we do expect as a result that this process of involving the people of our country in this hearing process, we do expect that you will help educate us, perhaps educate yourself, that you will help raise the level of consciousness in this country as to the risks involved, as to the costs involved, as to the absoute necessity of our establishing a very high priority in meeting this problem head on and taking whatever steps are necessary, hopefully in a cost-effective, sensible, reasonable fashion to make sure that we pass on to our children and grandchildren, for their use and enjoyment, a planet that is at least as safe, and as attractive, and beautiful as the one that we inherited from our parents.

[The prepared statement of Mr. Scheuer follows:]

OPENING STATEMENT
HON. JAMES H. SCHEUER
JULY 30, 1983

THE NATURAL RESOURCES, AGRICULTURE RESEARCH AND ENVIRONMENT SUBCOMMITTEE WILL COME TO ORDER.

THE PROPER DISPOSAL OF HAZARDOUS WASTES IS OF GREAT CONCERN TO THE PUBLIC, INDUSTRY AND GOVERNMENT.

THE CONCERN OF THIS SUBCOMMITTEE IS THAT EVEN WELL-INTENTIONED AND GENERALLY ACCEPTED MANAGEMENT OF HAZARDOUS WASTE, SUCH AS THE USE OF LANDFILLS, SURFACE IMPOUNDMENTS, AND LAGOONS, COULD RESULT IN A SUBSTANTIAL THREAT TO HUMAN HEALTH AND THE ENVIRONMENT.

A MARCH 1983 REPORT
ISSUED BY THE
OFFICE OF TECHNOLOGY
ASSESSMENT ON
"TECHNOLOGIES AND
MANAGEMENT STRATEGIES
FOR HAZARDOUS WASTE
CONTROL" EVALUATED
THE EXTENT OF HAZARDOUS
WASTE MISMANAGEMENT.

THE REPORT STATED THAT,
"IN THE PAST, MOST
HAZARDOUS WASTES
HAVE BEEN LAND DISPOSED
(AS MUCH AS 80 PERCENT)
AND, ACCORDING TO EPA
ESTIMATES, 90 PERCENT
OF THESE WERE PROBABLY
MISMANAGED."

THUS, THE PURPOSE OF THIS CONGRESSIONAL INVESTIGATION IS TO SEARCH FOR ANSWERS TO QUESTIONS SUCH AS:

- CAN HAZARDOUS WASTE LANDFILLS EVER BE 100% SAFE FROM LEAKAGE?

- ARE THERE VIABLE COST-EFFECTIVE ALTERNATIVES TO LANDFILLS?

- ONCE GROUNDWATER IS CONTAMINATED WITH HAZARDOUS WASTES, CAN IT EVER BE COMPLETELY CLEANED UP?

THE FURLEY LANDFILL POSES
A UNIQUE OPPORTUNITY
FOR THE SUBCOMMITTEE
TO EXAMINE A SITE
THAT BEGAN
OPERATION IN
1977 BUT BEGAN LEAKING
AND WAS CLOSED IN 1982.

THEREFORE, WE WILL EXAMINE
WHAT WENT WRONG WITH
THE LANDFILL AND HOW
IT CAN BE PREVENTED IN
THE FUTURE.

NOW, I TURN THIS MEETING
OVER TO MY DISTINGUISHED
COLLEAGUE FROM KANSAS,
DAN GLICKMAN.

Mr. SCHEUER. Now, to introduce the witnesses and to add some specific and thoughtful knowledge of the specific problems of this site, I'd like to pass on the gavel and the microphone to Congressman Dan Glickman.

Mr. GLICKMAN. Thank you, Jim.

First of all, I might state for the record that we'll deviate a little bit from our schedule today. Our first witness, when I finish my opening statement, will be State Representative Ben Foster, speaker pro tem of the Kansas House, who I believe is heading up an interim committee, studying related problems. We also have State Senator Norma Daniels here, who is also on that committee. Then we'll be moving to Peter Vardy of waste management. After that we'll take a panel, panel 2, of Mrs. Sharilyn Dienst, concerned citizen, and Mr. Mike Everhart of the county health department. Panel 3 will be Barbara Sabol of the State department of health, and the Kansas attorney general's office and the EPA, and our fourth panel will be our geological panel, Dr. Berg, Mr. Wilson, and Mrs. Butler with the Kansas Engineering Society.

I, first of all, would like to thank Congressman Scheuer for coming here. Many of you have seen Congressman Scheuer at work. He has been an active participant in the Rita Lavelle and Gorsuch activities of the last several months. He actually had as much to do with that as anyone that we were able to determine the improprieties within the Environmental Protection Agency, and those improprieties did not take place in the abstract. They largely took place because of the issue of toxic waste disposal, waste dumping, the exact problem that we have here at the Furley site, and it had to do with what information was available, what was hidden, perhaps what was used in a political context, and in a very strong, bipartisan sense which grew out of the Scheuer investigation.

Most of you are aware of the committee and the fact the action of the House of Representatives with respect to the Environmental Protection Agency, as Jim said, today the idea is to examine the scientific data on the extent of environmental contamination caused by this landfill at Furley, exploring the available technologies to clean up the site, and to consider ways to prevent future environmental contamination by hazardous waste landfills, both here in Kansas and in the United States.

The contamination at the Furley landfill has been the subject of charges and countercharges many years now. Unfortunately all the argument over who did not do what is not getting the contaminated land and ground water cleaned up, and I have personally been sick and tired of people pointing the finger of blame at others in the Furley case. I think it's too late for that and it's not relevant. The site is already contaminated. What we need to do now is to get the place cleaned up and see what can be done to prevent further contamination, as well as consider the technology currently available to prevent environmental contamination at all landfills across the United States. The problem at Furley is not an isolated incident.

A recent study conducted by the Office of Technology Assessment, which is an arm of Congress, indicates that the current Federal policy for hazardous waste landfills is inadequate, and that States like Kansas are being given increasing responsibilities for hazardous waste management without being provided the technical and financial resources to meet those increased responsibilities. In fact, EPA estimates that 90 percent of the landfills in the United States are probably mismanaged.

Clearly we need to develop a technological basis to correct the types of problems that have occurred at Furley and all across the country. There is a growing body of scientific evidence which indicates that landfills are not the proper way to safely dispose of toxic wastes at all. If the technology indicates that these landfills cannot be operated safely, or there is a much better way to dispose of hazardous waste, then we should close them down.

I hope that this meeting will answer some of these questions.

[The prepared statement of Mr. Glickman follows:]

OPENING STATEMENT

HONORABLE DAN GLICKMAN

FURLEY HAZARDOUS WASTE LANDFILL
JULY 30, 1983

TODAY WE WILL EXAMINE THE CURRENT SCIENTIFIC DATA ON THE EXTENT OF THE ENVIRONMENTAL CONTAMINATION CAUSED BY THE FURLEY HAZARDOUS WASTE LANDFILL, EXPLORE THE AVAILABLE TECHNOLOGIES TO CLEAN UP THE FURLEY SITE, AND CONSIDER WAYS TO PREVENT FUTURE ENVIRONMENTAL CONTAMINATION BY HAZARDOUS WASTE LANDFILLS THROUGHOUT THE UNITED STATES.

THE ENVIRONMENTAL CONTAMINATION AT THE FURLEY LANDFILL HAS BEEN THE SUBJECT OF CHARGES AND COUNTERCHARGES FOR SEVERAL YEARS NOW. UNFORTUNATELY, ALL THE ARGUING OVER "WHO DID NOT DO WHAT" IS NOT GETTING THE CONTAMINATED LAND AND GROUNDWATER CLEANED UP. I AM SICK AND TIRED OF PEOPLE POINTING THE FINGER OF BLAME AT OTHERS ON THE FURLEY CASE. IT'S TOO LATE FOR THAT. THE SITE IS ALREADY CONTAMINATED. WHAT WE NEED TO DO NOW IS GET THE PLACE CLEANED UP AND SEE WHAT CAN BE DONE TO PREVENT FURTHER CONTAMINATION, AS WELL AS CONSIDER THE TECHNOLOGY CURRENTLY AVAILABLE TO PREVENT ENVIRONMENTAL CONTAMINATION AT ALL LANDFILLS ACROSS THE COUNTRY.

THE PROBLEM AT THE FURLEY HAZARDOUS WASTE LANDFILL IS NOT AN ISOLATED INCIDENT. A RECENT STUDY CONDUCTED BY THE OFFICE OF TECHNOLOGY ASSESSMENT INDICATES THAT CURRENT FEDERAL POLICY FOR HAZARDOUS WASTE LANDFILLS IS INADEQUATE, AND THAT STATES LIKE KANSAS ARE BEING GIVEN

INCREASING RESPONSIBILITIES FOR HAZARDOUS WASTE MANAGEMENT WITHOUT BEING PROVIDED THE TECHNICAL AND FINANCIAL RESOURCES TO MEET THESE INCREASED RESPONSIBILITIES. IN FACT, THE EPA ESTIMATES THAT 90% OF THE LANDFILLS IN THE U.S. ARE PROBABLY MISMANAGED. CLEARLY WE NEED TO DEVELOP A TECHNOLOGICAL BASIS TO CORRECT THE TYPES OF PROBLEMS THAT HAVE OCCURRED AT FURLEY AND ALL ACROSS THE COUNTRY.

THERE IS A GROWING BODY OF SCIENTIFIC EVIDENCE WHICH INDICATES THAT LANDFILLS ARE NOT THE PROPER WAY TO SAFELY DISPOSE OF TOXIC WASTES AT ALL. IF THE TECHNOLOGY INDICATES THAT THESE LANDFILLS CANNOT BE OPERATED SAFELY OR THAT THERE IS A MUCH BETTER WAY TO DISPOSE OF HAZARDOUS WASTE, WE SHOULD CLOSE THEM DOWN.

I HOPE THIS MEETING WILL ANSWER SOME OF THE QUESTIONS AND CONCERNS THAT HAVE BEEN RAISED. I WANT TO THANK THE EXPERT WITNESSES THAT HAVE AGREED TO ASSIST US WITH THIS EFFORT TODAY.

Mr. GLICKMAN. I want to thank the witnesses who have come here, and our first witness is State Representative Ben Foster.

Ben, why don't you go up here to the witness table. I don't think you have a prepared statement. Why don't you sit in the middle so you'll have a mike.

STATEMENT OF BEN FOSTER, KANSAS STATE REPRESENTATIVE

Mr. FOSTER. I don't have a prepared statement, and I have no testimony. Congressman Glickman, Mr. Chairman, thank you very much for letting me have a few seconds of your time. I only want to be here to get into your record.

I have been identified as State Representative Ben Foster. I'm the speaker pro tem of the Kansas House of Representatives. I also chair a special joint House-Senate Committee that is studying the problem at Furley, during the time that our legislature is not in session. We are meeting at least once a month. We are doing this study in depth.

Senator Norma Daniels, who is here this morning, is a member of my committee. We'll meet—and the real purpose of my presence this morning is to take advantage of your news media. We'll meet close to the Furley site on Friday, August 26 at 2 o'clock in the Bel Air fire station basement. We'll have a public hearing. I hope that we'll have a turnout that will exceed yours. I would be very pleased if we had this many people, and I do hope that our friends of the media will spread the word.

And I would also like to tell you, Mr. Chairman and Congressman Glickman, that you may have the benefit of whatever information we gain in our study, which will not be concluded until December. If you will have your staff talk to my staff, perhaps we cannot plow the same ground. I think one of your staff members has already told me that we have been in touch with you, is that correct?

Mr. GLICKMAN. We'll be glad to share with you any and all data that we get, and I assume that we'll be able to get the information from you as well.

Mr. FOSTER. My staff person, who is Mr. Raymond, R-a-y-m-o-n, Powers of the Legislative Research Department, State House, Topeka, Kans., and we'll be very pleased to work closely with you, and I thank you very much for your time.

Mr. GLICKMAN. Thank you, Ben; it's a pleasure to have you here. And Senator Norma Daniels, it's a pleasure to have you here as well.

Our first witness is from the Waste Management Co., the company which has been operating the Furley landfill. My witness list, I have Peter Vardy, but I think that there are others with Waste Management.

Are you here, Mr. Vardy? Come on up to the witness table, and anybody else who would want to be with you at that table, that would be fine.

I would state for you and all witnesses that your entire statement will appear in the record, so you may feel it appropriate to summarize if you deem it, or you may read it. We would like to keep the time down as much as possible in order to give time for questions, so any and all parts of your statement will be included in the record, and you may proceed.

STATEMENT OF PETER VARDY, VICE PRESIDENT FOR ENVIRONMENTAL MANAGEMENT, WASTE MANAGEMENT, INC., ACCOMPANIED BY DONALD WALLGREN, DIRECTOR, ENVIRONMENTAL MANAGEMENT; FRED ROBERTS, VICE PRESIDENT, WASTE MANAGEMENT OF NORTH AMERICA; DAVE HENDRON, WOODWARD-CLYDE CONSULTANTS

Mr. **Vardy**. Thank you, Mr. Chairman, Congressman Glickman, good morning. My name is Peter Vardy. I am vice president for Environmental Management, Waste Management, Inc. With me this morning are three gentlemen who will be available to answer questions, depending on the nature of the questions that you may have. They are Fred Roberts, who is vice president of Waste Management of North America, a wholly owned subsidiary.

Mr. **Glickman**. Why don't you ask them to come on up now with you if possible, at least a couple of them.

Mr. **Vardy**. I would like to ask them to come up. Mr. Donald Wallgren, who is director of Environmental Management for Waste Management, and Mr. Dave Hendron, who is with the consulting firm of Woodward-Clyde Consultants, who has done much of the technical work on the Furley site.

We thank you for the opportunity to meet with you here this morning, and to provide you with information on our NIES facility, the site that as you know is better known in this area as the Furley site. Much has been said about problems at the NIES facility and land disposal of hazardous wastes in general. I think we have a very positive story to tell about both the NIES facility and the continuing role of land disposal in the overall management of hazardous wastes. Unfortunately, the positive side of our company's actions at this facility and the future need for land disposal have received very little, if any, attention in the media. That is why we are very pleased to be here this morning and to discuss this particular problem.

This hearing will presumably address the issues of what went wrong at the Furley site, what could have been done to prevent the problems encountered at the site, and how can the experience at Furley be related to the broader issues of hazardous waste disposal in general, and the use of land disposal techniques in particular.

As the largest operator of hazardous waste treatment, storage disposal facilities in this country, and we operate currently a total of 20 such facilities in addition to some additional transfer stations, our company has had extensive experience with the siting, engineering, development, operation of a wide variety of treatment storage disposal facilities. With your permission we would like to share with you some of our general views on the genesis of the problem at NIES and on land disposal technology as related to the overall management of chemical wastes.

I would like to make this presentation in two parts. The first part will address specifically the NIES facility, including background information, the site investigation, remedial investigation actions, and our interaction with the regulatory agencies. The second part of my presentation will address the questions, "What went wrong at NIES?" and "How can the NIES experience be related to national hazardous waste disposal regulations and policies?"

I'll start by providing a very brief background and history of the NIES facility. The site is located on 80 acres in a rural area about 10 miles northeast of Wichita. The former owners and operators of the site obtained a permit from the Kansas Department of Health and Environment in 1977, and went into operation that same year.

Chemical Waste Management, Inc., a wholly owned subsidiary of Waste Management, Inc., acquired the site from the prior owners in November, it says here, but actually the acquisition was made in December 1980. The basic facilities and processes employed at the site then, and which continued until the site was closed in January 1982, consisted of the following: Two evaporation ponds, four treatment ponds and two disposal trench areas.

As a result of expanded environmental investigations in conjunction with the proposed site expansion, very low concentrations of volatile organics were found in a spring discharging into Prairie Creek one-half mile north of the site. Upon further investigation, higher concentrations of chemicals were found in borings on the site's northern boundary early in 1982. The facility was then ordered closed by the Governor on January 18, 1982.

The very same day, January 18, 1982, that we were notified that the Governor was closing the site, a team of officials from our corporate office, plus Mr. Dave Hendron, our consultant from Woodward-Clyde Consultants, flew to Topeka to meet with KDHE and U.S. EPA officials, even though that was the first we were made aware of these findings we made a commitment to investigate and take appropriate action.

One week later, on January 25, we presented the agencies with a very detailed investigative plan. We made that commitment without knowing the extent of the problem and, consequently, what the cost or the time requirements would be to take the appropriate action.

An extensive investigation of the site and surrounding area was immediately undertaken by our geotechnical consultant, Woodward-Clyde. All components of the program, including its design and results, were continuously reviewed by the Kansas Department of Health and Environment, their geotechnical consultant, U.S. EPA, and other appropriate agency officials. The intent of the investigation was to develop a comprehensive understanding of the geology and hydrogeology to assess the potential impact of the site operation on ground water resources.

The extent of the investigation included drilling of over 40 soil borings to evaluate subsurface soil and bedrock conditions. Some borings were continuously sampled with large diameter rotary core barrel sampling tools to obtain optimum logging of vertical profile. Installation of over 75 monitoring wells to evaluate ground water conditions. These wells were installed at various elevations to determine ground water levels, rate and direction of flow, and extreme care was taken to minimize affecting lower water resources when drilling through upper water levels.

Laboratory testing for the presence of all EPA priority pollutants in over 200 water samples obtained from the monitoring wells; also, biweekly sampling from the spring flowing into Prairie Creek and from several sampling locations within the creek.

Mr. **Glickman**. Excuse me, Mr. Vardy. Do you intend to read your whole statement?

Mr. **Vardy**. Yes, I believe we were allotted 15 minutes for this presentation. I don't expect it to take much longer than that.

Mr. **Glickman**. OK. Thank you.

Mr. **Vardy**. Sampling and testing of onsite evaporation and treatment ponds used for fluid disposal, for assessment of fluid compatibility with subsurface soils. This work included a complete review of site background data.

Now, the conclusion is reached on the basis of the geologic and hydrogeologic model included the following. Residential wells surrounding the site were not affected by the site disposal activities. The chemical migration at the site is primarily confined to a discontinuous zone in the weathered soil profile, which is referred to as the A-zone located above and separated from the zone that constitutes the uppermost aquifer in the vicinity of the site, which is referred to as the B-zone.

Chemical migration from the site facilities into the A-zone was possible primarily as a result of the following factors:

The original design prepared by the prior owners did not consider minor, but very important details of site geology and their effect on contaminant transport potential within the soils overlying the regional groundwater at the site.

The original design prepared by the prior owner did not consider the potential interaction between certain wastes and the soil materials surrounding the disposal trenches, such as the incompatibility of residual carbonate soils with acid waste fluids.

The original design provided for treatment of fluids in unlined ponds resulting in maximum driving heads for fluid migration from the site.

And, finally, the original design did not provide for adequate control of infiltration of surface water through the final cover over the completed disposal trenches.

Based on the comprehensive site investigation, it was judged prudent to implement site improvements which would minimize and essentially eliminate the potential for chemical migration from the site. The improvements were selected on the basis of recently developed geological and hydrogeological data and with the objective of minimizing the formation of leachate and its migration into pathways which may be hydrologically connected to usable groundwater or surface water resources.

The site improvements included—I draw your attention, Mr. Glickman, to the summary of the work that has been accomplished at the site since your earlier statement might have led some people to believe that in fact nothing has been done at that site to date to correct the problems. This summarizes some of the work that has been accomplished:

Containment and cleanup, removal of fluids from the A-zone and installation of gravel-filled drainage trenches.

Removal and/or treatment of sources of chemical wastes which contribute to leachate production and subsequent migration.

Acid removal from treatment ponds and solidification, neutralization of sludges in the treatment ponds.

Construction of a new cover over completed waste disposal trenches, properly sloped to promote runoff and minimize leachate production and movement.

Construction of a new lined disposal cell meeting current RCRA standards and designed to accommodate the features identified by the comprehensive site investigation.

Before commenting further on the remedial program and site improvements, I think it is important to understand the cooperative working relationship that was established with the responsible regulatory agencies, and with particular emphasis on the KDHE. It was agreed with the agency that once the investigation was completed, a fast-track schedule would be followed to commence necessary site improvements without waiting for all of the design details to be complete.

In order to follow this procedure, it was necessary to keep the KDHE and other agencies fully informed of our findings and proposed plans. It was agreed that for ease of communication the KDHE would be the lead agency and that they in turn would receive the necessary approvals and provide required information to the other agencies.

In reviewing our records, there were over a dozen major meetings held between January 1982 and this date with the KDHE and the other agencies during which our plans and proposed actions were presented and discussed. A chronology of these meetings is attached to my statement for your information.

As a result of this cooperative working arrangement, we were able to promptly undertake the first steps in the corrective program during the summer of 1982 and complete the program late in 1982 with the exception of seeding the new covers over the previously filled areas and the decommissioning of the treatment ponds. The seeding work was completed early this spring and only the decommissioning of the treatment ponds remained to be done. This latter task must be carried out on a high priority basis. Also, we are continuing to monitor the ground water at Spring No. 6 and Prairie Creek to evaluate the effectiveness of our remedial program.

The responsible position and actions taken by our company are reinforced by the level of expenditures for the investigation and improvements at the site to date. We have expended roughly $3 million for investigative work and construction at the site since January 18, 1982. This was all done on an extremely accelerated basis and in the absence of any legal order. We also proceeded with this work without any explicit promise that the site would ever be reopened.

As would be expected, the issue of public health was a very important one, and in our opinion was adequately addressed. The public health issues essentially involves groundwater contamination and its potential impact on either private wells or where the groundwater emerges at Prairie Creek at Spring No. 6. There has been no evidence that any private wells are being adversely affected by the site.

Volatile organic compounds have been identified in Spring No. 6 at low concentrations, which range from 60 to 225 parts per billion, or parts per billion. I'd like to remind you that those don't include dioxin, Mr. Chairman, so we don't get into the quintillion testing program here; however, this should be viewed in proper perspective. This is not very significant in our opinion when one compares it with the city of Wichita water supply in which we have tested volatile organics ranging from 42 to 75 parts per billion. We are not suggesting that there is anything wrong with the Wichita water supply, but merely to point out this as a comparison between the two. Also, it is noteworthy that volatile organics have never been identified more than one mile downstream from Spring 6.

We believe our company's responsibility and cooperative action and commitments are well documented by our actions at the site. As further evidence of this, we have attached to our statement three letters which are referenced here. I think the letters attach to the promptness and effectiveness of the action that we have taken.

Having now presented you with considerable site-specific information, the question arises, what went wrong at the Furley site. Some of the specific technical reasons which caused the existing environmental problems we have discussed; namely, the problems with the original design of the site and the weaknesses in the original investigation which was made at the site, but I would like to add the observation that the root causes of the problem are directly related to the lack of sufficient detail to which most geotechnical investigations were performed for hazardous waste disposal site before the 1970's and the general level of sophistication of design, construction, and regulatory oversight practices which existed at that time.

We often fall into the trap of looking today at hazardous waste disposal sites which were constructed in the early or mid 1970's, or even before then, and relate those experiences to what we might expect or anticipate from sites that are being constructed today, or will be constructed in the future. I can state unequivocally that had the siting, design and operational criteria provided by RCRA, and specifically the land disposal regulations promulgated in July 1982 been followed at this site, nothing would have gone wrong with the NIES facility.

How could the problem have been prevented? As I have just suggested, the application of recently promulgated regulations would have prevented the problem. But, clearly, the state-of-the-art at the time of the original development of this site was such that some of the geotechnical problems were not adequately addressed and other preventative measures incorporated into present-day designs were not applied.

To insure that all problems are properly addressed in a facility design, it is important that a multidisciplinary approach, including involvement by all appropriate agencies, be utilized to provide better insight into site conditions and potential problems. I am not suggesting that every opponent or self-styled expert in hazardous waste management must necessarily be consulted in the design and development of the hazardous waste facility, but it has been our experience with sites which we have initiated ourselves that the development of a consensus on at least the technical aspects of site design between interested Federal, State, and local agencies and departments is essential to the successful development of hazardous waste management facilities.

Finally, how can the NIES experience be related to present and future hazardous waste disposal practices in Kansas and throughout the Nation?

The voices that cry out "ban the landfill," whether motivated by the "not-in-my-backyard" syndrome or a lack of accurate information, do a great disservice to the development of systematic, rational solutions to the very real hazardous waste problems which our society faces today.

While there isn't too much in the specific NIES experience that has broad implications on landfill practices throughout the country, there are a number of lessons which should be heeded. First of all, not withstanding the sweeping and simplistic statements made by a number of self-styled experts, all landfills do not leak. Certainly, one can be disingenuous about the subject and state that all waste-containment media, whether they are made of clay liners, synthetic liners, concrete, steel, or any other material, may release some quantity of contained liquid.

What really matters is not the semantics of leakage, but whether by virtue of geological setting, climatic conditions, liner and leachate collection systems, cover design, pretreatment of waste materials, and any number of other factors, there is for certain waste streams a highly reliable system of land disposal which will not adversely affect the air, water and land environment of the disposal site.

We know now that the land disposal of significant quantities of liquid wastes, whether in containerized or bulk form, is not a good practice. This practice has, in fact, been made illegal by the existing regulations. We know that the disposal of certain organic wastes such as concentrated solvents may not be compatible with specific soil and liner materials and should, therefore, be avoided. We know that other organic wastes can more efficiently be treated so that they are neutralized, oxidized, reduced, hydrolyzed, fixed, solidified, deep-well injected, land farmed, evaporated or incinerated at sea and thereby rendered nonhazardous, less hazardous or, after processing, more safely disposable to land.

All of these alternative technologies notwithstanding, disposal to land, continues to play an integral role in the overall management of hazardous waste. It can safely receive and contain the products of pretreated and treated wastes, incinerated wastes, air and water pollution control residues and effectively serve as the depository of other wastes which are, based on established standards of concentration, not mobile in the environment, persistent, highly toxic, or have a propensity to bioaccumulate.

Those responsible for the protection of the public from the health and environmental effects of toxic wastes must recognize the role which each alternative technology plays in the overall management of the waste products of our industrial society. Such responsible management must also consider the various volume reduction options of hazardous wastes generated at the source, such as dewatering, detoxification, or the implementation of in-plant process changes.

Future solutions to hazardous wastes disposal will lie in the proper application of all the technology alternatives available to us today based on regional and site-specific environmental, technical, economic and, to be sure, sociopolitical considerations. Regulations now on the books, the recently initiated part B application which we intend to submit on this site, and new proposed legislation related to the RCRA reauthorization, both in the House and in the Senate, will go a long ways toward meeting the goals of the responsible and safe disposal of our hazardous wastes.

In closing, may I remind the committee that the environmental problems at NIES are essentially the responsibilities of the former owners who permitted, designed, and constructed this disposal facility. The solutions, on the other hand, site improvements and responsibility for over $3 million—$3 million in study and remedial work expenditures to date, were the contributions of our company, which acquired this site in late 1980. At NIES, as is the case at all our other facilities, Waste Management, Inc., and other responsible companies in the hazardous waste management industry, are part of the solution, gentlemen; they are not part of the problem.

We commend your committee for your interest in our experience at the NIES site and our other chemical waste operations, and we thank you for the opportunity to present to you some of our views on this most important topic.

[The prepared statement of Mr. Vardy follows:]

STATEMENT PRESENTED TO THE
U.S. HOUSE OF REPRESENTATIVES SUBCOMMITTEE ON
NATURAL RESOURCES, AGRICULTURAL RESEARCH AND ENVIRONMENT

by

Peter Vardy
Vice President -- Environmental Management
Waste Management, Inc.

July 30, 1983

Good morning. We thank you for giving us the opportunity to meet with you and to provide you with information on our N.I.E.S. hazardous waste facility, which is better known locally as the Furley site. Much has been said about problems at the N.I.E.S. facility and land disposal of hazardous wastes in general. I think we have a very positive story to tell about both the N.I.E.S. facility and the continuing role of land disposal in the overall management of hazardous wastes. Unfortunately, the positive side of our company's actions at this facility and the future need for land disposal have received very little, if any, attention in the media. That is why we are very pleased to have this opportunity today.

This hearing will presumably address the issues of what went wrong at the Furley site; what could have been done to prevent the problems encountered at the site; and how can the experience at Furley be related to the broader issues of hazardous waste disposal in general and the use of land disposal techniques in particular.

As the largest operator of hazardous waste treatment/storage/disposal facilities in this country (a total of 20 facilities), our company has had extensive experience with the siting, engineering, development and operation a wide variety of waste treatment, storage, and disposal facilities. With your permission, we would like to share with you some of our general views on the genesis of the problem at N.I.E.S. and on land disposal technology as related to the overall management of chemical wastes.

I would like to make this presentation in two parts. The first part will address specifically the N.I.E.S. facility, including background information, the site investigation, remedial actions, and our interaction with the regulatory agencies. The second part of my presentation will address the questions, "What went wrong at N.I.E.S.?" and "How can the N.I.E.S. experience be related to national hazardous waste disposal regulations and policies?"

I'll start by providing a very brief background and history of the N.I.E.S. facility. The site is located on 80 acres in a rural area about 10 miles northeast of Wichita. The former owners and operators of the site obtained a permit from the Kansas Department of Health and Environment (KDHE) in 1977, and went into operation that same year. Chemical Waste Management, Inc., a wholly-owned subsidiary of Waste Management, Inc., acquired the site from prior owners in November 1980. The basic facilities and processes employed at the site then and which continued until the site was closed in January 1982 consisted of the following: two evaporation ponds, four treatment ponds, and two disposal trench areas.

As a result of expanded environmental investigations in conjunction with the proposed site expansion, very low concentrations of volatile organics were found in a spring discharging into Prairie Creek one-half mile north of the site. Upon further investigation, higher concentrations of chemicals were found in borings on the site's northern property boundary early in 1982. The facility was then ordered closed by the Governor on January 18, 1982.

The very same day, January 18, that we were notified that the Governor was closing the site, a team of officials from our Corporate Office plus Dave Hendron, our consultant from Woodward-Clyde Consultants, flew to Topeka to meet with KDHE and U.S.E.P.A. officials. Even though that was the first we were made aware of these findings, we made a commitment to investigate and take appropriate action. One week later, on January 25, we presented the agencies with a very detailed investigative plan. We made that commitment without knowing the extent of the problem and, consequently, what the cost or the time requirements would be to take the appropriate action.

An extensive investigation of the site and surrounding area was immediately undertaken by our geotechnical consultant, Woodward-Clyde. All components of the program, including its design and results, were continuously reviewed by the Kansas Department of Health and Environment (KDHE), their geotechnical consultant, U.S.E.P.A., and other appropriate agency officials. The intent of the investigation was to develop a comprehensive understanding of the geology and hydrogeology to assess the potential impact of the site operation on groundwater resources. The extent of the investigation included:

- Drilling of over 40 soil borings to evaluate subsurface soils and bedrock conditions; some borings were continuously sampled with large diameter rotary core barrel sampling tools to obtain optimum logging of the vertical profile.

- Installation of over 75 monitoring wells to evaluate ground water conditions. Wells were installed at various elevations to determine ground water levels, rate and direction of flow. Extreme care was taken to minimize affecting lower water resources when drilling through upper water levels.
- Laboratory testing for the presence of all EPA priority pollutants in over 200 water samples obtained from the monitoring wells; also, bi-weekly sampling from the spring flowing into Prairie Creek and from several sampling locations in the creek.
- Sampling and testing of on-site evaporation and treatment ponds used for fluid disposal, for assessment of fluid compatibility with the subsurface soils. This work included a complete review of site background data.

The site investigation resulted in the development of a geologic and hydrologic model of subsurface conditions and identification of possible fluid transport paths and mechanisms from the disposal facilities. Conclusions reached on the basis of the geologic and hydrologic model included the following:

- Residential wells surrounding the site were not affected by the site disposal activities.
- The chemical migration at the site is primarily confined to a discontinuous zone in the weathered soil profile (referred to as the "A-Zone") located above, and separated from the zone that constitutes the uppermost aquifer in the vicinity of the site (referred to as the "B-Zone").

- Chemical migration from the site facilities into the "A-Zone" was possible primarily as a result of the following factors:
    - The original design prepared by the prior owner did not consider minor, but very important, details of site geology and their effect on contaminant transport potential within the soils overlying the regional ground water at the site.
    - The original design prepared by the prior owner did not consider the potential interaction between certain wastes and the soil materials surrounding the disposal trenches (e.g., the incompatibility of the residual carbonate soils with acid waste fluids).
    - The original design provided for treatment of fluids in unlined ponds resulting in maximum driving heads for fluid migration from the site.
    - The original design did not provide for adequate control of infiltration of surface water through the final cover over completed disposal trenches.

Based on the comprehensive site investigation, it was judged prudent to implement site improvements which would minimize and essentially eliminate the potential for chemical migration from the site. The improvements were selected on the basis of recently developed geological and hydrogeological data and with the objective of minimizing the formation of leachate and its migration into pathways which may be hydrologically connected to usable ground water or surface water resources. The site improvements include the following:

- Containment and cleanup/removal of fluids in the A-Zone by installation of gravel-filled drainage trenches.
- Removal and/or treatment of sources of chemical wastes which contribute to leachate production and subsequent migration (i.e., acid removal from treatment ponds, and solidification and neutralization of sludges in the treatment ponds).
- Construction of a new cover over completed waste disposal trenches, properly sloped to promote run-off and minimize leachate production and movement.
- Construction of a new lined disposal cell meeting current RCRA standards and designed to accommodate the features identified by the comprehensive site investigation.

Before commenting further on the remedial program and site improvements, I think it is important to understand the cooperative working relationship that was established with the responsible regulatory agencies, with particular emphasis on the KDHE.

It was agreed with the agencies that, once the investigation was completed, a "fast-track" schedule would be followed to commence the necessary site improvements without waiting for all of the design details to be completed. In order to follow this procedure, it was necessary to keep the KDHE and other agencies fully informed of our findings and proposed plans. It was agreed that, for ease of communication, the KDHE would be the lead agency and that they in turn would receive the necessary approvals and provide required information to the other agencies. In reviewing our records, there were over a dozen major meetings held between January, 1982 and this date with the KDHE and the other agencies during which our plans and proposed actions were presented and discussed. (Chronology of meetings attached.)

As a result of this cooperative working arrangement, we were able to promptly undertake the first steps in the corrective program during the summer of 1982 and to complete the program late in 1982, with the exception of seeding the new cover over the previously filled areas and the decommissioning of the treatment ponds. The seeding was completed earlier this spring and only the decommissioning of the treatment ponds remains to be done. This latter task must be carried out on a high priority basis. Also, we are continuing to monitor the ground water, spring #6, and Prairie Creek to evaluate the effectiveness of our remedial program.

The responsible position and actions taken by our Company are reinforced by the level of expenditures for the investigation and improvements at the site to date. We have expended roughly $3 million for investigative work and construction at the site since January 18, 1982. This was all done on an extremely accelerated basis and in the absence of a legal order. We also proceeded with this work without the explicit promise that the site would be re-opened.

As could be expected, the issue of public health was a very important concern and, in our opinion, was adequately addressed. The public health issue essentially involves ground water contamination and its potential impact on either private wells or where the ground water emerges at Prairie Creek at spring #6. There has been no evidence that any private wells are being adversely affected by the site. Volatile organic compounds have been identified in spring #6 at low concentrations, which range from 60 to 225 ppb (parts per billion). However, this should be viewed in proper perspective. This is not very significant when one compares it with the City of Wichita water supply, in which we have tested volatile organics ranging from 42 to 75 ppb. We are not suggesting there is anything wrong with the Wichita water supply but merely point this out for comparison purposes. Also, it is notewrothy that volatile organics have never been identified more than one mile downstream from spring #6.

We believe that our Company's responsible and cooperative actions, and commitment are well documented by our actions at the site. However, as further evidence of this, I want to point out three pieces of correspondence by State officials and their consultant, CH_2M Hill. Please refer to the following:

1. September 8, 1982 letter from Joseph Harkins, Secretary of the KDHE to Barbara Hamilton, Staff Counsel for the South Carolina Department of Health and Environment.
2. September 10, 1982 letter from Mel Gray, KDHE Project Director for N.I.E.S. facility and Deputy Director of the Division of Environment, to Barbara Hamilton, Staff Counsel for the South Carolina Department of Health and Environment.
3. February 10, 1983 letter from KDHE's technical consultant, John Ramage, Director, Geotechnical Engineering for CH_2M Hill to Mel Gray.

Having now presented you with considerable site-specific information, what went wrong at the N.I.E.S. (Furley) site? Some of the specific technical reasons which caused the existing environmental problems at this site were previously discussed in this statement. I would like to add the observation that the root causes of the problems at this site are more directly related to the lack of sufficient detail to which most geotechnical investigations were performed for hazardous waste disposal sites before the late 1970's and the general level of sophistication of design, construction, and regulatory over-sight practices which existed at that time. I can state unequivocally that, had the siting, design and operational criteria provided by RCRA and, specifically, the land disposal regulations promulgated in July 1982 been followed, nothing would have gone wrong at the N.I.E.S. facility.

How could the problem have been prevented? As I have just suggested, the application of recently promulgated regulations would have prevented the problem. But, clearly, the state-of-the-art at the time of the original development of this site was such that some of the geotechnical problems were not adequately addressed and other preventative measures incorporated into present day designs were not applied. To ensure that all problems are properly addressed in a facility design, it is important that a multidisciplinary approach, including involvement by all appropriate agencies be utilized to provide better insight into site conditions and potential problems. I am not suggesting that every opponent or self-styled expert in hazardous waste management must necessarily be consulted in the design and development of a hazardous waste facility, but it has been our experience with sites which we have initiated ourselves that the development of a concensus on at least the technical aspects of site design between interested federal, state and local agencies and departments is essential to the successful development of hazardous waste management facilities.

Finally, how can the N.I.E.S. experience be related to present and future hazardous waste disposal practices in Kansas and throughout the nation?

The voices that cry out "ban the landfill", whether motivated by the "not-in-my-backyard" syndrome or a lack of accurate information, do a great disservice to the development of systematic, rational solutions to the very real hazardous waste problems which our society faces today.

While there isn't too much in the specific N.I.E.S. experience that has broad implications on landfill practices throughout the country, there are a number of lessons which should be heeded. First of all, notwithstanding the sweeping and simplistic statements made by a number of self-styled "experts", all landfills do not leak. Certainly, one can be disingenuous about the subject and state that all waste-containment media, whether they are made of clay liners, synthetic liners, concrete, steel, or any other material may release some quantity of contained liquid. What really matters is not the semantics of leakage but whether by virtue of geologic setting, climatic conditions, liner and leachate collection system design, cover design, pretreatment of waste materials, and any number of other factors, there is, for certain waste streams, a highly reliable system of land disposal which will not adversely affect the air, water and land environment of the disposal site.

We know now that the land disposal of significant quantities of liquid wastes, whether in containerized or bulk form, is not a good practice. We know that the disposal of certain organic wastes, such as concentrated solvents, may not be compatible with specific soil and liner materials and should, therefore, be avoided. We know that other organic wastes can more efficiently and safely be destroyed in incinerators. We know that certain wastes can be treated so that they are neutralized, oxidized, reduced, hydrolyzed, fixed, solidified, deep well injected, land farmed, evaporated or incinerated at sea and thereby rendered non-hazardous, less hazardous or, after processing, more safely disposable to land.

All of these alternative technologies notwithstanding, disposal to land continues to play an integral role in the overall management of hazardous waste. It can safely receive and contain the products of pretreated and treated wastes, incinerated wastes, air and water pollution control residues and effectively serve as the depository of other wastes which are, based on established standards of concentration, not mobile in the environment, persistent, highly toxic or have a propensity to bioaccumulate. Those responsible for the protection of the public from the health and environmental effects of toxic wastes must recognize the role which each alternative technology plays in the overall management of the waste products of our industrial society. Such responsible management must also consider the various volume reduction options of hazardous wastes generated at the source, such as dewatering, detoxification or the implementation of in-plant process changes.

Future solutions to hazardous wastes disposal will lie in the proper application of all the technology alternatives available to us today based on regional and site-specific environmental, technical, economic and, to be sure, socio-political considerations. Regulations now on the books, the recently initiated Part B Application process, and new proposed legislation related to the RCRA reauthorization both in the House and Senate will go a long way towards meeting the goals of responsible and safe disposal of our hazardous wastes.

In closing, may I remind this Committee that the environmental problems at N.I.E.S. are essentially the responsibility of the former owners who permitted, designed, and constructed this disposal facility. The solutions, site improvements and responsibility for over $3 million in study and remedial work expenditures were the contributions of our Company, which acquired this site in late 1980. At N.I.E.S, as is the case at all of our other facilities, Waste Management, Inc. and other responsible companies in the hazardous waste management industry are part of the solution rather than part of the problem.

We commend your committee for your interest in our experiences both at the N.I.E.S. site and our other chemical waste operations, and we thank you for the opportunity to present to you some of our views on this most important topic.

July 30, 1983

SUMMARY OF N.I.E.S. REGULATORY MEETINGS

January 18, 1982	Meeting at KDHE (Topeka) Re: Closure Order Attendees (18): WMI (4), WCC (1), KDHE (9), USEPA (2), CH$_2$M Hill (2).
January 25, 1982	Meeting at KDHE (Topeka) RE: N.I.E.S. site response plan Attendees (26): WMI (6), WCC (5), KDHE (8), USEPA (4), CH$_2$M Hill (2), McGill & Associates (2), KGS (1), WSCDCH (1).
February 17, 1982	Meeting at N.I.E.S. site with KDHE RE: Project update Attendees (10): WMI (4), WCC (2), KDHE/EPA, etc. (4).
March 15, 1982	Meeting at KDHE (Topeka) RE: Status report - well installation and sampling Attendees (19): WMI (4), WCC (3), KDHE (7), USEPA (1), CH$_2$M Hill (1), McGill (1), KGS (1).
May 19, 1982	Meeting at KDHE (Topeka) RE: Ramage CH$_2$M Hill response questions Attendees (26): WMI (5), WCC (2), KDHE (11), USEPA (2), WSCDCH (1), McGill (1), CH$_2$M Hill (2), Lawyer (1), KGS (1).
May 25, 1982	Meeting at WMI (Oak Brook) RE: Technical discussion of two letters Attendees (7): WMI (3), WCC (3), CH$_2$M Hill (1).
June 2, 1982	Meeting at WMI (Oak Brook) with KDHE RE: Communication procedure, site improvements, and re-opening site. Attendees (14): WMI (5), WCC (2), KDHE (3), KAG (1) CH$_2$M Hill (1), McGill (1), McDonald Tinker (1)
June 10, 1982	Meeting at KDHE (Topeka) RE: Project update Attendees (20): WMI (4), WCC (1), KDHE (8), KGS (1), CH$_2$M Hill (2), WSCDCH (1), McGill (1), USEPA (2).
June 30, 1982	Meeting at KDHE (Topeka) RE: Discussion Procedure 11, letter, injection well Attendees (10): WMI (2), WCC (3), KDHE (4), Wilson (1)
August 18, 1982	Meeting at KDHE (Topeka) RE: Permit application submittal Attendees (10): WMI (2), WCC (2), Wilson (1), KDHE and others (5).
September 15, 1982	Meeting at KDHE (Topeka) RE: Status update Attendees (26): WMI (6), WCC (3), KDHE (8, USEPA (1), Wilson (2, McGill (1), KGS (1), WSCDCH (1), CH$_2$M Hill (2)

October 11, 1982	Meeting at KDHE (Topeka) RE: Delisting petition Attendees (12); WMI (2), WCC (1), KDHE (6), USEPA (1), Black & Veatch (2).
November 1, 1982	Meeting with KDHE (Kansas City) RE: Completion of site improvements and re-opening Attendees (7): WMI (4), KDHE (3)
December 9 & 10, '82	N.I.E.S. site and Topeka RE: Site tour and progress report Attendees (24): WMI (6), WCC (2), KDHE (8), USEPA (2), WSCDCH (1), KGS (1), KAG (1), McGill (1), CH_2M Hill (2).
May 5, 1983	Meeting in Kansas City WCC presentation to Public Health Officials and KDHE (approx. 50)
May 19, 1983	Meetings in Topeka -- Project status update o Legislative Post Audit Committee Attendees (10): WMI (3), WCC (2), Committee (5) o KDHE Attendees (21): WMI (3), WCC (2), KDHE (12), USEPA (2), IWCDCH (1), CH_2M Hill (1) o Kansas Attorney General Attendees (3): WMI (1), WCC (1), McGill (1)
May 27, 1983	Meeting at KDHE (Topeka) RE: Project status update (follow-up of May 19, 1983 meeting) Attendees (12): WMI (1), WCC (1), KDHE (10).
July 12, 1983	Meeting at KDHE (Topeka) RE: Technical status update, decommissioning plans Attendees (18): WMI (2), WCC (1), KDHE (11), USEPA (2), KGS (1), WSCDCH (1).
July 22, 1983	Meeting at KDHE (Topeka) RE: Further remedial actions and decommissioning plans Attendees (17): WMI (3), WCC (1), KDHE (9), USEPA (2), WMI Attorney (1), McGill (1)

NOTE:

WMI	Waste Management, Inc.
WCC	Woodward-Clyde Consultants
CH_2M Hill	(Consultants for KDHE)
KGS	Kansas Geologic Survey
WSCDCH	Wichita Sedgwick County Department of Community Health
KAG	Kansas Attorney General
KDHE	Kansas Department of Health & Environment

RECEIVED

SEP 09 1982

DEPUTY DIRECTOR
OF ENVIRONMENT

8 September 1982

Barbara J. Hamilton
Staff Counsel
South Carolina Department of Health and Environmental Control
2600 Bull Street
Columbia, S. C. 29201

Dear Ms. Hamilton:

I am writing in regard to your inquiry about my perception of Waste Management, Inc.'s willingness and ability to comply with regulations and laws calculated to protect the health and minimize danger to life and property and about its enthusiasm for going beyond regulatory requirements in order to insure safe operations and environmental protection.

Waste Management, Inc. is the sole owner of National Industrial Environmental Services, Inc. which owns and operates a hazardous waste facility in the state of Kansas. In January of 1982 a mild degree of contamination was discovered in the groundwater near this facility and it was subsequently closed.

During the last nine months Waste Management, Inc. has invested several hundred thousand dollars in the development and implementation of a remedial plan at this facility. Our agency has on several occasions placed major requirements on WMI in regard to the cleanup plan and each time these have been met or exceeded with no resistance. I have been impressed WMI has employed one of the best known consulting firms in the country to assist them in responding to this problem. We too have employed a well known consulting firm to assist us in supervising the cleanup plan development and its implementation. Our consultants and my staff both have repeatedly advised me of their satisfaction that WMI and their consultants have "spared no expense" in resolving this issue.

By way of background information I should advise you that N.I.E.S. was an independently held corporation and was purchased by Waste Management, Inc. less than one year prior to the discovery of the problem. The problem turned out to be associated with a deficiency in the original geologic investigations which were done prior to the purchase of the facility by WMI.

Notwithstanding the fact that they bought a "pig in a poke", they have not hesitated to assume full responsibility for the correction of the problem.

I hope this information is useful to you.

Sincerely,

Joseph F. Harkins

JFH/nb
cc: Jim Aiken
Mel Gray

September 10, 1982

DIRECTOR OF ENVIRONMENT
SEP 10 1982

Ms. Barbara J. Hamilton
Staff Counsel
South Carolina Department of
Health and Environmental Control
2600 Bull Street
Columbia, S.C. 29201

RE: The application of Waste Management, Inc. to Amend the Licenses and Permits of Chem Nuclear System, Inc.

Dear Ms. Hamilton:

This is in response to your letter of 3 September 1982 in which you requested my perception of Waste Management, Inc.'s willingness and ability to comply with regulations and laws calculated to protect the health and minimize danger to life and property and about its enthusiasm for going beyond regulatory requirements in order to insure safe operations and environmental protection.

Waste Management, Inc. does operate the National Industrial Environmental Services hazardous waste site near Furley, Kansas. Waste Management, Inc. purchased this hazardous waste disposal site in mid 1979. In December 1981, approximately 18 months, later it was determined that the integrity of the site had been breached and very small quantities of pollutants were starting to migrate via the groundwater off site. This incident was in no way related to the operation by Waste Management, Inc., but was related to a very thin, porous strata which had been missed in the original geologic site evaluation.

Upon determination that the site was leaking small amounts of contaminants, Waste Management immediately embarked upon investigation and correction of the problem. They have employed leading consultants for field investigations and corrective proposals and, to date, have expended in excess of a million dollars on investigative and corrective actions. Additional corrective actions will be taking place over the next few months, with the expectation that site problems will be more than adequately corrected. To date, there has been no exposure to the public or the general environment as a result of this problem, and none is expected in the future.

DEPOSITION
EXHIBIT
7
6-23-93

Working with Waste Management, Inc. has been a pleasure in that their policy appears to be one of attacking a problem with the best resources available until corrections have been accomplished. There has never been any difficulty in obtaining technically sound action on their part. In many instances, they appear to go beyond the call of duty for the benefit of increased safety or for the benefit of public relations.

Based on Kansas experience I would doubt that you would have any problems with their operating in your state. If I can be of further assistance to you in this matter, please do not hesitate to contact me.

Yours truly,

Melville W. Gray

Melville W. Gray, P.E.
Deputy Director
Division of Environment

cac

C - Jim Aiken
Joe Harkins
R. Lewis Shaw

CH2M
HILL
engineers
planners
economists
scientists

16

DEPUTY
DIRECTOR OF
ENVIRONMENT

FEB 15 1983

February 10, 1983

DI40.11

Mr. Melville W. Gray
Deputy Director, Division of Environment
Kansas Department of Health and Environment
Forbes Field
Topeka, Kansas 66620

Dear Mel:

Subject: NIES Facility, Site Improvement
Program - Plans and Specification Review

We have completed our review of the final version of the plans and Specifications for the NIES site Improvement Program. Based on our experiences in the States of New York and New Jersey developing plans and specifications for similar types of site improvement programs, the level of detail, technical requirements, and overall NIES program represents the current "state of the art."

With this total program implemented, the state will have in place, a thorough, well designed, constructed, and controlled facility. The remaining two elements that need to be developed by NIES are:

- Detailed monitoring program, including well locations and design, sampling frequency, test, and reporting requirements.
- Contingency plan for additional remedial actions, should monitoring detect changes in site conditions.

The details of these elements are dependent; however, on the state's decision to allow reopening and continued operation, or to require site closure. Until this decision is made, conceptual plans are all that can be reasonably expected from NIES.

We wish to reaffirm CH2M HILL's position that, with appropriate monitoring, a contingency plan, and full

DEPOSITION
EXHIBIT
5

implementation of the site improvement program, we see no technical reasons for not allowing the reopening of the NIES site.

SPECIFIC COMMENTS

- No changes have been made on the disposal well drawing, nor are any specifications included in the package. It is assumed that these details will not be developed by NIES until the decision on reopening the site, or not, has been made.
- Evaporation Pond Decommissioning and Upgrading Drawings 4-02 through 4-04 are missing.
- Drawing 5-15, Borrow Area No. 2; Sections and Details is missing. This is critical to confirm notes on Drawing G-06 that state Borrow Area No. 2 will not be used for storm water retention. Section and details are required to determine how separation will be maintained between the west and north perimeter storm drainage ditches and Borrow Area No. 2.

This letter completes our current assignments for you. It has been a most enjoyable, technically challenging, and professionally rewarding experience working on this project, and with you and the department's staff. We remain available, and ready to assist you in future activities as required.

You should receive shortly, two final billings one of $3,496, the other for $5,500. This gives a project total billing of $85,241. If you have any questions, or need additional cost details, please let me know.

Enclosed (finally), as promised some time ago, is a copy of our technical specification for the Synthetic Membrane Cover that will be installed at Love Canal. Any comments you might have would be appreciated.

Mel, Bill Wallace and I wish to thank you and staff for the opportunity to work with you on this most challenging technical assignment and the professional courtesies

SUMMARY OF TECHNICAL INFORMATION

NATIONAL INDUSTRIAL ENVIRONMENTAL SERVICES, INC. (N.I.E.S.)
Furley, Kansas
by Woodward-Clyde Consultants

July 30, 1983

INTRODUCTION

The protection of ground water resources around hazardous waste disposal facilities is typically the major geotechnical issue faced during siting and design studies. When unexpected chemical migration is detected in the area, the first questions that must be raised and accurately answered are, "Are these chemicals coming from the site facilities?" and, if so, "What went wrong in the siting and design process that resulted in inadequate performance of the disposal site?" Upon detailed investigation, it is typically found that an insufficient understanding of the "ground" and the "water" conditions was developed during siting and design. The relationships between the ground, the water conditions comprising the disposal site, and their relationship with the wastes to be disposed were usually insufficiently defined. The successful achievement of the ground water protection objective during subsequent work requires comprehensive, thorough site investigations, in which the complexities, nonuniformities, and incompatibilities of the site subsurface conditions and wastes to be disposed of are identified and taken into account in the project plan.

The following case study of the National Industrial Environmental Services, Inc. (N.I.E.S.) facility identifies an approach being followed to establish criteria for improvement of the existing site to achieve the long-term ground water protection objective.

BACKGROUND

The N.I.E.S. facility is located near Furley, Kansas, about 10 miles northeast of Wichita, In January 1982, surface water sampling of a spring flowing into Prairie Creek, about 1/2 mile north of the 80-acre disposal facility, indicated trace levels (typically in the range of 10 to 50 parts per billion) of volatile organic chemicals. Two questions immediately arose:

- Are ground water resources affected?
- Did the chemicals detected emanate from the disposal facility, and, if so, why and how did they reach the creek?

SITE INVESTIGATION

An extensive investigation of the disposal facility site and surrounding area was immediately undertaken by the owner and the owner's geotechnical consultant. All components of the program, including its design and results, were continuously reviewed by the Kansas Department of Health and Environment (KDHE) and their geotechnical consultant. The intent of the investigation was to develop a comprehensive understanding of the geology and hydrogeology to assess the potential impact of the site operation on ground water resources. Appropriate site improvement designs would be instituted, if deemed necessary. The extent of the investigation included:

- Drilling of over 40 soil borings to evaluate subsurface soils and bedrock conditions; some borings were continuously sampled with large diameter rotary core barrel sampling tools to obtain optimum logging of the vertical profile.
- Installation of over 75 monitoring wells to evaluate ground water conditions. Wells were installed at various elevations

to determine ground water levels, rate and direction of flow. Extreme care was taken to minimize affecting lower water resources when drilling through upper water levels.

- Laboratory testing for the presence of all EPA priority pollutants in over 200 water samples obtained from the monitoring wells; also, bi-weekly sampling from the spring flowing into Prairie Creek and from several sampling locations in the creek.
- Sampling and testing of on-site evaporation and treatment ponds used for fluid disposal, for assessment of fluid compatibility with the subsurface soils. This work included a complete review of site background data.

RESULTS OF THE SITE INVESTIGATION

The site investigation resulted in the development of a geologic and hydrologic model of subsurface conditions and identification of possible fluid transport paths and mechanisms from the disposal facilities. Conclusions reached on the basis of the geologic and hydrologic model included the following:

- Residential wells surrounding the site were not affected by the site disposal activities.
- The chemical migration at the site is confined to a discontinuous zone in the weathered soil profile (referred to as the "A-Zone") located above, and separated from, the zone that constitutes the uppermost aquifer in the vicinity of the site (referred to as the "B-Zone").
- Chemical migration from the site facilities into the "A-Zone" was possible primarily as a result of the following factors:

- The original design did not consider minor, but very important, details of site geology and their effect on contaminant transport potential within the soils overlying the regional ground water at the site.
- The original design did not consider the potential interaction between certain wastes and the soil materials surrounding the disposal trenches (e.g., the incompatibility of the residual carbonate soils with acid waste fluids).
- The original design provided for treatment of fluids in unlined ponds, resulting in maximum driving heads for fluid migration from the site.
- The original design did not provide for adequate control of infiltration of surface water through the final cover of completed disposal pits.

SELECTION OF SITE IMPROVEMENTS

Based on the comprehensive site investigation, it was judged prudent to implement site improvements which would minimize and essentially eliminate the potential for chemical migration from the site. The improvements were selected on the basis of recently developed geological and hydrogeological data and with the objective of minimizing the formation of leachate and its migration into pathways which may be hydrologically connected to usable ground water or surface water resources. The site improvements included the following:

- Containment and cleanup/removal of fluids in the A-Zone by installation of gravel-filled drainage trenches.

- Removal and/or treatment of sources of chemical wastes which contribute to leachate production and subsequent migration (i.e., acid removal from treatment ponds, and solidification and neutralization of sludges in the treatment ponds).
- Construction of a new cover over completed waste disposal trenches, properly sloped to promote run-off and minimize leachate production and movement.
- Construction of a new, lined disposal cell designed to accommodate the complex geologic features identified by the comprehensive site investigation.

Site improvements were made during the summer and fall of 1982. The performance of these improvements has been, and will continue to be, evaluated by periodic monitoring of water levels in numerous on and off-site wells and by sampling and analyzing waters in Prairie Creek and the spring in which trace chemicals were originally detected. To date (July 1983) there have been significant reductions in the fluid levels in the A-Zone. There have also been significant reductions in chemical concentrations in A-level wells and in approximately 75 percent of B-level wells. It is our opinion that these data indicate that the site improvements are performing as predicted by the design studies.

Mr. GLICKMAN. Thank you, Mr. Vardy, for your testimony. I would like to ask you a few questions.

Does the site contain wastes—and I am going to list some potential wastes and I'd like just your answer of whether it contains these wastes—from Thomson-Hayward Chemical Company of Kansas City, which is a basic producer of 2,4,5-T and Silvex; Colony Chemicals of Wichita, producing 2,4,5-T; PBI-Gordon Corporation of Kansas City, producing 2,4,5-T; Nova Products of Kansas City, producing Ronnel; Dymon, Inc., of Kansas City, producing Silvex.

Why don't you identify yourself.

Mr. WALLGREN. Don Wallgren, Director of Environmental Management for Waste Management.

We cannot answer that question specifically here, but we do have a complete list of the wastes that have gone into this site in a very substantial document, and we would be glad to provide you that answer in letter form following this session today.

Mr. GLICKMAN. That would be great. If that's satisfactory with you, we would like to know that.

[The information follows:]

Waste Management, Inc.
[illegible]

August 30, 1983

The Honorable Dan Glickman
U. S. House of Representatives
2435 Rayburn House Office Building
Washington, D. C. 20515

Dear Representative Glickman:

During the hearing of the U. S. House of Representatives Subcommittee on Natural Resources, Agricultural Research and Environment held in Wichita, Kansas, on July 30, 1983, you asked us the following question relative to the N.I.E.S. (Furley) hazardous waste facility:

> "Does the site contain wastes from Thompson-Hayward Chemical Co. of Kansas City (basic producer of 2,4,5-T and Silvex), Colony Chemicals Co. of Wichita (producing 2,4,5-T), PBI-Gordon Corp. of Kansas City (producing 2,4,5-T), Nova Products of Kansas City (producing Ronnel), Dymon, Inc. of Kansas City (producing Silvex), or Patterson Chemical Co. of Kansas City (producing Silvex)?"

Based on the review of both our records and the State's records, the site contains waste from Thompson-Hayward Chemical Company of Kansas City and the PBI-Gordon Corporation of Kansas City. We have no information that wastes were received from the other companies stated in your question. Attached are copies of information from the State files showing the types and quantities of wastes accepted and the year in which it was received. Our information leads us to believe there was no dioxin present in these waste streams. To support this conclusion, I am attaching the following:

1. A letter dated September 19, 1977 from the Thompson-Hayward Chemical Co. in which they stated that they maintain controls to preclude the possibility of dioxin leaving the plant in waste materials; and

2. Copies of correspondence showing that no dioxin was present in the PBI-Gordon waste. Please be aware that we are continuing to investigate records on the actual laboratory data which we will provide to you should additional information become available.

I apologize for the delay in responding to your question, but we wanted to be sure that we had done a thorough review of our records prior to sending you a response. Hopefully this responds satisfactorily to your question. Please contact me if additional information is desired.

Sincerely,

Donald A. Wallgren
Director
Environmental Management

DAW:mc

Encl.

Thompson-Hayward Chemical Company

September 19, 1977

Kansas Industrial Environmental Services, Inc.
8808 North 127th Street East
P.O. Box 745
Wichita, Kansas 67201

Gentlemen:

I believe you indicated to us some time ago that you could dispose of waste material from our phenoxy herbicide plant.

I would like for you to let me know if you are able to handle this material for us and what your charges would be including hauling costs from our plant site in Kansas City, Kansas to your disposal site.

I am attaching a list of the various chemical compounds that could be contained in the waste material.

Since included is 2,4,5-T Phenol and its products I would like to make the following statement regarding the possible concern regarding the presence of dioxin.

We maintain controls to preclude the possibility of detectable quantities of dioxin leaving our plant in either finished product or waste materials. Every batch of the intermediate in which the formation of dioxin is potential is tested in our laboratory for the presence of dioxin. Gas chromatography is used for these tests.

I would appreciate hearing from you as soon as possible regarding your capability of disposing of such wastes for us.

In addition to the above wastes which would be of an on going nature we have a small quantity, approximately 400 gallons, of Melamine and Chlorinated Melamine. This material could be at a pH as low as 2. Attached is a copy of a data sheet with a description of Melamine. I would like to know if you can dispose of this material and what your charges would be.

Sincerely,

THOMPSON-HAYWARD CHEMICAL COMPANY

G. L. Foehringer

George L. Foehringer
Director of Manufacturing

RECEIVED SEP [illegible] 1977

```
                                  PBI/GORDON CORPORATION
                                  EPA ID # : KSD007124357

TACT : ALAN PASCHANG        --PHONE #-- 816/421/4070
RESS : 300 SOUTH THIRD STREET,BOX 2276        CITY : KANSAS CITY          STATE : KANSAS
SAS COUNTY : WYANDOTTE                        KANSAS DISTRICT : NE

 DISPOSAL//******************************** WASTE NAME ******************************//DISPOSAL ESTIMATED//ACTUAL VOLUME
 PERMIT #//                                                                      //VOLUME/YR CUBIC FT// DISPOSED OF
  800116 // PAPER,PLASTIC BAGS,CARTONS,FIBER CONTAINERS                            //      29,700     //        378
  800133 // 2,4D, MCPD, AND BANVEL-D CONTAMINATED FLOOR SWEEP AND SOIL             //         368     //        905
  800145 // SOIL                                                                   //       1,620     //      2,024
                                                                       1980 TOTALS//      31,688     //      3,307
 -------------------------------------------------------------------------------------------------------------------
  100196 // SOIL
  100221 // OFF-SPEC PRODUCT: 5X SEVIN DUST,LIQUID, DMB82                          //       2,700     //      5,246
  100271 // PAPER,PLASTIC BAGS,CARTONS,FIBER CONTAINERS                            //         316     //        162
  100307 // DIRT,DUST,POWDER,FLOOR SWEEP,DRY-RITE,SLUDGE                           //      29,700     //      3,051
                                                                                   //         737     //      1,751
                                                                       1981 TOTALS//      33,453     //     10,210
 -------------------------------------------------------------------------------------------------------------------
                                                                      GRAND TOTALS//      65,141     //     13,517
```

```
                                  THOMPSON-HAYWARD CHEMICAL CO
                                  EPA ID # : KST210010062

TACT : WILLIS HART          --PHONE #-- 913/321/3131
RESS : 5200 SPEAKER ROAD                      CITY : KANSAS CITY          STATE : KANSAS
SAS COUNTY : WYANDOTTE                        KANSAS DISTRICT : NE

 DISPOSAL//******************************** WASTE NAME ******************************//DISPOSAL ESTIMATED//ACTUAL VOLUME
 PERMIT #//                                                                      //VOLUME/YR CUBIC FT// DISPOSED OF
  770189 // MELAMINE                                                               //         235     //         58
  770190 // PHENOXY HERBICIDE PRODUCTION WASTE CHEMICALS                           //         884     //        471
                                                                       1977 TOTALS//       1,119     //        529
 -------------------------------------------------------------------------------------------------------------------
  780190 // SCRAP EMULSIFIERS AND PESTICIDES                                       //       2,948     //      1,760
                                                                       1978 TOTALS//       2,948     //      1,760
 -------------------------------------------------------------------------------------------------------------------
  770190 // PHENOXY HERBICIDE PRODUCTION WASTE CHEMICALS                           //         884     //         36
  780190 // SCRAP EMULSIFIERS AND PESTICIDES                                       //       2,948     //      1,251
  790005 // PARATHION                                                              //           0     //
  790110 // HERBICIDE PRODUCTION WASTE CHT REAGENT, 1104 RESIDUE AND CATACARB 251-H//         442     //        669
                                                                       1979 TOTALS//       4,274     //      1,956
 -------------------------------------------------------------------------------------------------------------------
  790110 // HERBICIDE PRODUCTION WASTE CHT REAGENT, 1104 RESIDUE AND CATACARB 251-H//         442     //        154
                                                                       1980 TOTALS//         442     //        154
 -------------------------------------------------------------------------------------------------------------------
  100374 // MISCELLANEOUS PESTICIDES. SEE HAZARDOUS SUBSTANCES & ADDITIONAL INFOR. //          14     //         14
                                                                       1981 TOTALS//          14     //         14
 -------------------------------------------------------------------------------------------------------------------
                                                                      GRAND TOTALS//       8,797     //      4,413
```

```
                                        THOMPSON-HAYWARD CHEMICAL CO
                                        EPA ID # : KST210010032

TACT : WILLIS HART          --PHONE #-- 913/321/3131
RESS : 5200 SPEAKER ROAD                        CITY : KANSAS CITY            STATE : KANSAS
SAS COUNTY : WYANDOTTE                          KANSAS DISTRICT : NE

DISPOSAL//****************************** WASTE NAME ******************************//DISPOSAL ESTIMATED//ACTUAL VOLUME
PERMIT #//                                                                          //VOLUME/YR CUBIC FT// DISPOSED OF
 780156 // PESTICIDES AND INTERMEDIATES                                             //       1,474     //        854
                                                                      1978 TOTALS//       1,474     //        854
 -----------------------------------------------------------------------------------------------------------------
 780156 // PESTICIDES AND INTERMEDIATES                                             //       1,474     //         81
                                                                      1979 TOTALS//       1,474     //         81
 -----------------------------------------------------------------------------------------------------------------
 780156 // PESTICIDES AND INTERMEDIATES                                             //       1,474     //        288
                                                                      1980 TOTALS//       1,474     //        288
 -----------------------------------------------------------------------------------------------------------------
                                                                     GRAND TOTALS//       4,422     //      1,219



                                        THOMPSON-HAYWARD CHEMICAL CO
                                        EPA ID # : IAD005277231

TACT : PARK MCCALLEY        --PHONE #-- 515/266/1191
RESS : P.O  BOX 1362                            CITY : DES MOINES             STATE : IOWA
SAS COUNTY :                                    KANSAS DISTRICT :

DISPOSAL//****************************** WASTE NAME ******************************//DISPOSAL ESTIMATED//ACTUAL VOLUME
PERMIT #//                                                                          //VOLUME/YR CUBIC FT// DISPOSED OF
 100345 // 2,4 DICHLOROPHENOXYACETIC ACID (2,4D)                                    //         104     //        104
                                                                      1981 TOTALS//         104     //        104
 -----------------------------------------------------------------------------------------------------------------
                                                                     GRAND TOTALS//         104     //        104
```

envirodyne
engineers
12161 Lackland Road
St. Louis, Missouri 63141
314-434-6960

REPORT OF ANALYSIS

Environment • Energy • Transportation • Food Processing

SUBMITTED BY: Kansas Industrial Environmental Services
Post Office Box 745
Wichita, Kansas 67201

DATE: November 21
PROJECT NO. 1609-1
P.O. Letter of 11/1

DATE RECEIVED: November 13, 1980
SAMPLE ANALYZED: Soil
METHODS USED: Extraction and EC detector

RESULTS:

*Soil <15 ppb by wt. of Dioxin

*Very large halogenated compound and maybe elemental BR_2 present.

$\$150^{00}$/
20^{2}/

Goes in PBI Gordon file
Date pd ______
CK # ______

ENVIRODYNE ENGINEERS

PBI/GORDON CORP.,
November 12, 1980.

MR. DANIEL JACKSON,
Kansas Industrial Environmental Services,
Wichita, Kans.

DEAR DAN: The truck load of soil picked up on November 11, 1980, by Kansas Industrial Environmental Services truck is the soil as approved for disposal by Kansas Health and Environment disposal permit number 80-145. To the best of our knowledge, this soil does not contain dioxin.

Sincerely,

ALAN A. PASCHANG,
Vice President.

KIES
SAVE THE LAND

KANSAS INDUSTRIAL ENVIRONMENTAL SERVICES,

November 11, 1980

15 ppb detection
None detected 11-17-80
PbI

Environmental Engineers
11261 Lackland Road
St. Louis, Missouri 63141

Attention: Dr. Carol Byington

Dear Dr. Byington:

Pursuant to your conversation with Mr. Cliff McDaniel, please analyze the soil sample enclosed for dioxin as soon as possible. Please phone the results to us at (316) 744-1286.

Thank you for your cooperation.

Sincerely,

Dan Jackson

Dan Jackson, Manager

DJ/js

[illegible]

Woodward Clyde Consul

REC
SEP

September 24, 1980
K80-44

Mr. Alan Paschang
Vice President Operations
PBI Gordon Corporation
300 South Third Street
Kansas City, Kansas 66110

RESULTS OF GAS CHROMATOGRAPHIC/
MASS SPECTROMETRIC ANALYSIS FOR TCDD

Dear Alan:

We have received a verbal communication from David Pasternack of Measurement Sciences Corporation in Garden City, New York, concerning test results from the three soil samples submitted from Pond #1. They have performed gas chromatographic/mass spectrometric analysis on the samples for tetra-chlorodioxin. The results: NO DIOXIN WAS DETECTED. The detection limit was 10 parts per billion (ppb).

The sample extract has been stored and the data recorded on magnetic tape. Measurement Sciences Corporation will be issuing a written report detailing the testing procedure and presenting the raw data and testing results.

Please contact us if we can be of further assistance.

Sincerely,

Philip J. Knotts
Senior Staff Engineer

J. D. Campbell

J. D. Campbell
Vice President

PJK:JDC:baf

Mr. GLICKMAN. The reason I'm asking the question, my first line of questioning relates to the questions of dioxin. All of these companies producing 2,4,5-T or similar chemicals are chemicals that could—I'm not saying are—but could be contaminated with dioxin, and so I'd like to ask the following questions: Does the landfill contain any dioxin? Do you know that?

Mr. WALLGREN. We are not aware of any dioxin present in the landfill. Our testing to date has not shown that there is any dioxin present.

Mr. GLICKMAN. Have you tested for dioxin?

Mr. WALLGREN. Yes, sir.

Mr. GLICKMAN. And is the government, either the Federal or State Government, currently testing for dioxin?

Mr. WALLGREN. I don't know the answer to that, on their testing. I believe they have some samples for testing, but I think it's more appropriate that they answer that question.

Mr. GLICKMAN. Does the landfill contain chemicals that may be contaminated with dioxin? It's a slight variation of my first question.

Mr. WALGREN. Not that we are aware of, sir.

Mr. GLICKMAN. Are you aware of test well No. 220 at the Furley site?

Mr. HENDRON. We are.

Mr. GLICKMAN. Has test well 220 ever been sampled for dioxin contamination?

Mr. HENDRON. We have taken several samples from well 220; I don't know that we have tested for dioxin from that well.

Mr. GLICKMAN. What has been the nature of your dioxin testing at the site?

Mr. HENDRON. I believe we have taken some samples from the test trenches into which the leachate is flowing and tested those for dioxin.

Mr. GLICKMAN. But you don't know whether you have ever tested that well 220 for dioxin contamination?

Mr. HENDRON. Yes, sir.

Mr. GLICKMAN. And can you find out, if possible, and let us know?

Mr. HENDRON. Yes.

Mr. GLICKMAN. Would you agree to allow the EPA to sample test well No. 220 for dioxin?

Mr. VARDY. Certainly. The EPA and the KDHE has every right to come in and test every well we have.

Mr. GLICKMAN. Well, I'm going to question them later about the gap in the information regarding that test well site, but you yourselves would not prevent them from testing that site or any other site or test well for dioxin or any other contaminant which is in their realm of responsibility to do?

Mr. VARDY. We would not prevent them, nor can we prevent them.

Mr. GLICKMAN. Let me ask just one more question——

Mr. VARDY. May I say, Mr. Glickman, that we have in the past followed the practice of splitting a good number of samples with them, and I believe over 120 such samples were split samples.

Mr. GLICKMAN. When you say split samples, what do you mean?

Mr. VARDY. We take samples and split—part is tested by us and part is tested by the EPA or KDHE.

Mr. GLICKMAN. And that has been the practice you have been following since the site was closed down?

Mr. VARDY. Yes; that's correct.

Mr. GLICKMAN. Who makes the judgment as to which you'll test and which samples that will be tested by the KDHE or the EPA?

Mr. HENDRON. The judgment is really up to the agencies. They have every right to split every sample. We notify them prior to our taking samples, and they can be present at the site. U.S. EPA is notified and they may be present at the site, and they make their own decisions as to whether they want to analyze that sample and what they analyze it for.

Mr. GLICKMAN. OK. We'll follow more up from them on this issue.

My last question, before I turn it over to Congressman Scheuer, concerns this book here. It's called "Technologies and Management Strategies for Hazardous Waste Control," put out by the Office of Technology Assessment, and I'm sure you people have seen this. It's the most complete book on waste disposal that I have seen, at least in readable language.

Now, this report, issued in March 1983, includes, and I quote:

> Current regulations for monitoring Resource Conservation and Recovery Act, or called RCRA, facilities, including landfills, are inadequate to provide assurance that the public health and environment will be protected, particularly over the long term.

Now, I would like to ask two questions. One, if the current regulations are inadequate since the Furley landfill has been leaking in the past, what actions will Waste Management, Inc., undertake to guarantee protection of health and the environment?

Mr. VARDY. Well, with regard to the existing site as it is today, and the nature of the materials that are there today, I think we have a better understanding than we ever had about the geology of the site and the pathways for migration of the site of contaminants. Therefore, I think, contrary to that sweeping statement that you referred to in that document, there are in fact monitoring techniques to determine whether—with considerable degree of accuracy—whether the site is continuing to generate contaminants or whether or not they are migrating off site. That can be done and will be done. That, in fact, has been done to a large degree through the last number of monitoring wells that have been installed, and the additional wells that we propose to install through a plan that we submitted to the agencies. That is one solution.

The other solution, of course, is to move the sources of contamination, which we feel are concentrated pretty much in the treatment ponds on the site, and we feel, and said in my statement, that that's the highest priority to correct as soon as possible.

Mr. GLICKMAN. OK. But going back to the broader picture for a moment, it's our information to date the landfill has probably been operated within the limits of all regulations. Nobody here is going to accuse you of not complying with regulations based upon what we know. However, the landfill still leaked. There is permeability problems. There has clearly been some contamination taken place.

And I guess my concern is that if the current regulations are not adequate, what actions will you take to insure that the landfill, if reopened or expanded, will not leak? I mean, will you go beyond the current regulations to insure that it will not leak?

Mr. VARDY. There is no question. But let me correct you, Congressman.

This site was not designed and was not constructed in accordance with current regulations. This site has interim status. Standards that existed during the application for interim status are different from the standards that were promulgated in July 1982, and this site bears no resemblance to a site that should be constructed in 1982.

Mr. GLICKMAN. I didn't say that. I said that you have operated the site within the limits of the regulations as they existed at that time, Mr. Vardy. I have no evidence to the contrary, but the site still leaked.

Mr. VARDY. Correct.

Mr. GLICKMAN. So, what I'm saying is that you may get into a position where the current legislations just are not adequate to protect the folks who live around the site and possibly who live away from the site, if you have got groundwater contamination. I'm saying, what can you do to go beyond those regulations if you have to; and will you?

Mr. VARDY. We can and we will and we have, and that is the performance that we have displayed at a number of other sites. I should probably point out to you that had we not acquired this site in 1980, you would be sitting there today with a site that was designed and operated under 1977, 1976 standards, by a small operator who certainly would not have had the financial capacity to correct the problems we have corrected, and it would now be entirely the burden of this State to correct the problem.

We stand behind this site; we always said we would. We have responded accordingly and we are prepared to do whatever is necessary to prevent any problems occurring from this site that would affect the neighbors and the residents of this area.

Mr. GLICKMAN. I think Mr. Wallgren wanted to make a comment.

Mr. WALLGREN. What I'd like to address here, as to how we can overcome some of the deficiencies that I think you are referring to here with the existing facility as it was designed and operated in the past. I'd just like to mention some of the design features that would overcome, that would prevent that very thing that was happening in the future, we now know more about the geology in the area, so that the base of the new disposal cell, which you'll see this afternoon, is at a higher elevation than it was in the past. We also are going in with a compacted clay liner. We are not just relying on the natural materials in that area but have a natural liner. We also have incorporated——

Mr. SCHEUER. Excuse me.

Have you ever tested that liner, that new clay liner, particularly if you are going to expand the facilities? Have you actually tested that liner?

Mr. **Wallgren**. Yes, we have. And at the conclusion of just a couple more remarks, I'll ask Mr. Hendron to address that specifically, since they are our consultants.

Mr. **Scheuer**. And that clarifies my previous question.

In testimony before our committee last November, Dr. Kirk Brown of Texas A&M stated, and I quote:

> Concentrated organic liquid-bearing wastes may alter the structure of clay soils, resulting in permeabilities one hundred to one thousand times greater than the values measured with water.

That means the ability of liquids to pass through is 1,000 times greater than when measured with water.

> Furthermore, 11 out of the 12 field cells lined with one type of flexible membrane liner have leaked.

Now, have you considered these dangers and these threats in considering your plans to reopen the site?

Mr. **Vardy**. Yes, we have. We are quite familiar with Dr. Brown's work. In fact, Dr. Brown acts as a consultant to our firm at many of our sites. What his studies have shown is that certain solvents affect certain types of clays, and he has dealt to date only with highly concentrated solvents. He has not worked with any leachates that are a result of a combination of solvents and ground water and other base materials.

Dr. Brown has stated unequivocally in testimony at some permit hearings that were held for our site in Lake Charles, La., that in applying the techniques that we apply today to the disposal of wastes in landfills—namely, the elimination of all liquids in landfills—the solidification, detoxification of all these wastes does not generate the problems that his studies have shown to be a problem. So any future operations at the site would do a number of things.

One, there would be no liquids placed in the landfill ever again; two, there would be no solvents ever going into the landfill. We do not place solvents in any landfills any more, and for one reason—one reason why we don't is because we have a good market, recycling markets for solvents today, and we have acquired some companies that specialize in the solvent recovery field. And, third, we are talking today about landfills.

When we talk about landfills, we are talking about the ultimate disposal of residues of treatment of wastes. Now, people talk about treatment as if, though, it were a total alternative to landfill, and that's totally erroneous. You treat, and the treatment results in a residue, albeit a harmless residue, which requires landfills. So you'll never eliminate landfills as being part of the total picture of waste management, hazardous waste management, and it is our intention—and we'll so propose through our part B application—to install at this site all the necessary treatment, the processing systems, which will result in rather benign residues which then have to be landfilled because nothing else you can do with them, and that's what we are proposing to do at that site. And I think by doing that, that will result in a very safe disposal facility.

Mr. **Scheuer**. Mr. Wallgren, did you have a final comment, or did you finish what you were going to say?

Mr. **Wallgren**. I would continue with some of the safety features that would be incorporated into the current design in the remedial program and proposed future actions. That is, I mentioned we have a compacted clay liner, we have a synthetic liner and we have a leachate collection zone. We have a cover that will go over this cell when it is completed that incorporates a synthetic liner and a flow zone to remove any liquids off the surface.

We also have proposed that it's only neutralized and solidified wastes that go into that disposal cell, so I think the operation is very significantly different than what was utilized at the facility in the past.

Mr. SCHEUER. OK.

Do you know what the site reopened—and, in fact, I'm told you would like it expanded in territory—can you guarantee at this hearing that NIES, through changes that both you, Mr. Vardy, and Mr. Wallgren mentioned, will result in a situation where there will be no leakage, in not only the short term, the next 5 years, but in the long term, the next 25 or 30 years?

Mr. VARDY. By guarantee, if you mean that we'll put all of the resources of our company and the financial guarantees that stand behind it to assure the people that that site will perform as designed, yes, the answer is yes.

Mr. SCHEUER. This is the testimony of Frank Wilson who will appear here later this morning. I don't want to anticipate his testimony. But since you are here, it will be interesting to get your reaction.

He says:

> Once the site is cleaned up to the satisfaction of EPA and KDHE, it should be closed. A recent survey done by Michael Ginzberg of the Wichita Eagle and Beacon showed that many of the large firms, such as Cessna Aircraft Company, have modified their procedures to reduce waste production and will not use the facility if it were to reopen. No effort will be made to find a suitable site if the facility is allowed to reopen.
>
> WMI will argue that they have constructed a membrane-lined pit and that the geology is no longer a factor. I do not agree. We have very little experience with these membrane liners in contact with the great variety of chemical compounds that they'll contain. If they leak, there is no way of knowing where the leak is; if they do not leak for 30 years after closure of the site, the firm's bond is returned and responsibility returns to the State. Monitoring will likely stop, and if leakage occurs a hundred years from now it probably won't be detected until it shows up in somebody's well.

Any reaction?

Mr. VARDY. Oh, sure. I'm not quite familiar with Mr. Wilson's background. I might tell you that——

Mr. SCHEUER. He is the senior geologist with the Kansas Geological Survey and an adjunct professor of geology at the University of Kansas. His specialty is engineering geology with more than 30 years of experience in the field.

Mr. VARDY. Well, that indicates we are on almost equal ground, because I have about 30 years of experience in engineering geology. The only difference is that I have about 15 years' experience with hazardous waste, as well.

I think in the geological area you can look at it very narrowly, just strictly from a geological standpoint. What I have just said was that you are not relying entirely on geologic conditions to provide the safety margin that you are looking for, but you are looking at a whole number of other considerations such as the removal of certain wastes from the landfill altogether.

In other words, you don't even consider burying them. The proper pretreatment of other wastes, so that only the residues which do not have the same toxic characteristics as the original material go into the landfill, the redirection of certain organic wastes into the incineration mode rather than landfill mode. The gentleman is looking at the entire problem from the strict standpoint of a geologist, and somewhat of an academic geologist, and he has every right to do so. But I submit to you that there is more to it than that.

The entire-waste management function and all of its applications need to be understood and studied, and in that sense that we are proposing is the state of the art. Certainly you can speculate on what's going to happen 100, 200, 300 years from now. We are saying we are not relying on that liner to do the entire job. We are not relying on the geologic conditions to do the entire job.

We are relying on a combination of prudent measures that are a result of the lessons that we have learned in recent years, and we have learned that lesson at Furley. We have learned that lesson at any number of other sites, and I think this is the total education that this industry has gotten in the field.

You, Mr. Chairman, have learned something new on dioxins only a few days ago. I think that will have some major implications as to how dioxin is handled, what kind of priorities are placed on the detection and proper disposal of dioxons. We'll be responsive to all new information that comes along in similar fashion, but while we are doing that we have a responsibility to handle waste materials, and because one or two companies said that they have found other alternatives and they don't need the site any more, that has very little to do with the fact that we have enormous quantities of waste generated in this country. And to the extent that we don't provide solutions to the disposal of that waste, we are forcing it underground. We are forcing it back into sewers, we are forcing it back into ditches, and into backyards, and that is no solution, either.

Mr. SCHEUER. Well, there are alternatives to land dumping and there are alternatives to sewers, but they cost more. The present environment regulations provide an economic incentive to land dumping because it's the cheapest form of disposal, and maybe we have got our priorities a little bit skewed in establishing in effect an economic incentive for land disposal when it may be not at all the least environmental degrading and health threatening alternative. And, of course, that's part of the job that Congressman Dan and I have to address ourselves in the months and years to come.

Let me ask you before you leave, Mr. Vardy, you mentioned the sweeping and simplistic statements made by a number of self-styled experts. As you cast an eye around the room, do you see any of these wretched self-styled experts in this very room?

Mr. VARDY. I have not cast my eye around this room nor have I seen any since I walked in here. But let me assure you that there are a good many people, albeit well-meaning, albeit concerned, and I have no problem with any citizen raising concerns and doubts about any facilities in their neighborhood.

By the same token, we find a good many people who are very vociferous whose primary interest is in the publication of some very early stages of some research that they have done which catches on like wildfire, and a good example—and by no means do I include Dr. Brown in that category, and Dr. Brown was very well-meaning in publishing his first work on the impact of solvents on liners—but I must tell you that the results of his work have been taken totally out of context and are continually used in public hearings and public meetings in very simplistic manner that I have just referred to by saying all landfills leak, and that statement based on Dr. Brown's work is not a fair statement.

Mr. SCHEUER. I must tell you, to round out the record, that virtually every witness we have had at our hearings, including professionals of your quality, made the categorical statements that all landfills eventually leak. The sole exception to that, that I can remember, was Rita Lavell.

Mr. VARDY. I certainly would not want to be thrown in that particular bag. But let me say that you can, and I have in my statement, if you will read it again—said, all containing materials leak, concrete leaks, steel leaks, everything leaks.

Mr. SCHEUER. That's exactly the problem.

Mr. VARDY. And I fully agree with you, Mr. Chairman, that that is a fair statement to make. The question is, what are the impacts of such leakage and over what period of time they occur and how they impact on ground water resources. That is the question; not whether they leak, but what their impact is. That's what counts.

Mr. GLICKMAN. Are you involved at all in the cleanup of ground water outside of waste-site areas? That is, is that part of your company's operation, your corporate activities? I assume you are in waste management and in a variety of its applications. Are you involved in ground water cleanup?

Mr. VARDY. Yes, we have been involved in ground water cleanup, yes.

Mr. GLICKMAN. To what extent, I mean, maybe other than cleaning up problems? Are you involved from an active, technological point in technologies to clean up ground water?

Mr. VARDY. Waste Management has a company which is ENRAC, which is Environmental Remedial Action, which is involved, for example, in the Seymour, Ind., cleanup work. Our work there, however, is restricted to above-ground cleanup. In other words, removal and disposal of waste materials and soils, but not ground water, so we are not contracting our work. In other words, we are not doing contract work for groundwater cleanup.

Mr. GLICKMAN. OK.

Well, we want to thank you for coming here today and testifying. You are going to—I believe you have agreed to provide us additional information on the specific nature of contaminants or chemicals that were placed into the site, and I particularly—you say you have a complete list, and I was particularly concerned about 2,4,5-T and the other related items which I mentioned, but I think that Mr. Walgren took down, we may have a couple other questions we would like to ask you, technical questions regarding the Furley site concerning the depth of ponds and related issues, and we would appreciate your answering those questions, as well.

Thank you very much.

Mr. VARDY. Thank you very much.

Mr. GLICKMAN. By the way, the subcommittee will be at the site at 3 o'clock. I believe you have been notified of that, too. Thank you very much.

Mr. GLICKMAN. Our next panel of witnesses are Mrs. Sharilyn Dienst, who has been actively involved in this issue as a concerned citizen; and Mr. Mike Everhart, with the Sedgwick County Health Department. And why don't you both come up here and, again, use the hand mike when you speak because it's the only way the people in the back of the room can hear you.

Before I introduce both of you, Senator Kassebaum has asked that a statement she has made to be included in the record, which it will, and State Representative Ardena Matlack has asked for that, and that will be included in the record. And I believe that there was a statement from the Sierra Club, and they have asked that that be included in the record, as well.

So, Mrs. Dienst, why don't you go ahead and begin and give us your statement. If you have a prepared statement, as I said before, you may feel free to summarize it and try to keep your prepared remarks, if possible, to 10 minutes or less so we can get to all the witnesses here.

STATEMENTS OF SHARILYN DIENST; AND MIKE EVERHART, SEDGWICK COUNTY HEALTH DEPARTMENT

Mrs. DIENST. I will, sir, I promise, about a minute or less.

I'm probably the self-styled hazardous waste expert Mr. Vardy referred to; we have had to be. We have had to learn everything there is to know, everything we could learn, because we have had a lack of cooperation from the State.

Mr. GLICKMAN. Just relax and hold it as close as you can to your mouth, because the people in the back of the room want to hear you.

Mrs. DIENST. The landfilling of hazardous waste is the only time-tested disposal method in use. Time has proven, without any doubt, that landfilling does not work. By siting a toxic waste landfill, you are selecting a group of citizens and telling them that they are going to bear the burden of responsibility for everyone's toxic offage, at the expense of their health and property. You are, in effect, depriving them of their basic human rights.

A recent EPA report of the NIES facility revealed that problems had already been found with the new synthetic liner and that the manufacturer will not even guarantee the safety of its own product. EPA has already published, and in the Federal Register, February 5, 1981, a statement that all landfills will leak eventually, regardless of Mr. Vardy's statements.

The practice of burying deadly chemicals in the Earth is not state of the art; it's just the cheapest method of disposal for the generator and the multimillion dollar disposal companies. It is the most expensive for the environment.

It is within your power, gentlemen, to force a halt to this systematic poisoning of the ground water of our Nation. I urge you to do so at once. I just read in the newspaper of a call for a national ground water policy. It said millions of people rely on ground water for their drinking water, and Congress must protect them from hazardous and other kinds of wastes.

WMI's financial reputation is well-known; their environmental reputation is being questioned across the country. Citizens who have been endangered by other WMI leaking landfills are not afraid to say, "No more." and, incidentally, we have a new cry—it's not, just not in my backyard, not in my water—and that's what we have gotten.

The citizens from the Furley area have led a pretty low-key opposition to reopening of the new site. Let me assure you that will not be the case if imminent signs of reopening the leaking landfill occur. We will not be forced into a position of again accepting the word of a company whose primary concern is money, or of depending upon the judgment calls of incompetent State officials.

The NIES landfill is not unique. NIES was a poorly studied, poorly developed, poorly operated, and poorly monitored experiment by the owners and the Kansas Department of Health and Environment. Both parties bear the blame for the irreversible groundwater contamination of an area that depended on private wells and for the failure to consider the effect the dump would have on the people.

From 1976, when the site was first proposed, to the present cleanup efforts of a failed site, certain key KDHE staff members have maintained a peculiar preoccupation with keeping the NIES site open, to the extent of withholding important information and reports from the EPA and other involved officials and citizens.

Secretary Sabol has said that she'll not consider any reopening of NIES until a proper cleanup plan is approved and in effect. WMI and some KDHE officials are satisfied that the dewatering trenches, the clay caps and the new plastic-lined pit have caused the site to stop leaking.

We question this seriously. Monitoring points on private property show contamination in greater levels than before the remedial operations began, and much higher than when contamination was first detected. Some onsite wells have risen dramatically in levels; one recently hit a high of 21 million parts per billion. KDHE officials and the company were not alarmed. They said that was not expected, but it's something we hear when something bad happens.

Mr. GLICKMAN. I think your statement was, was not unexpected. I wanted to make sure that you got that right.

Mrs. DIENST. Thank you.

Both of the aquifers have been contaminated, both the A and B zones, and the remedial efforts do not even address the B level water table which supplies water to the private area wells.

A frequent comment that we hear is that no human health risk exists from the NIES site and that there is no indication of contamination of area private wells.

I'm not going to bore everybody in here by reading these 19 chemicals, but I've listed for the committee 19 organic chemicals that have been detected in private wells. We have had 19 excuses, too, as to why they are there. These explanations and excuses may be valid, but we don't know that. We don't really know how many more chemicals are in any of the monitored wells because of insufficient monitoring. There are over 700 separate chemical waste components disposed of at NIES and only 26 are tested for routinely, so we don't know what's in there.

Recently, the EPA did test for dioxin. NIES has buried suspected dioxin-contaminated waste. I guess WMI hasn't read their book; I have. And most of the companies you mentioned have brought waste out there. There is 2,4,5-T, 2,4,5 or 2,4,6. There is all kinds of dioxin, possible dioxin-contaminated waste buried at NIES, all over the site, and some of it is buried very close to well 220. I hope that has been tested. There is over 30,000 cubic feet of probable dioxin-contaminated waste at NIES.

Recently, a State legislative committee asked WMI and its consultant from Woodward-Clyde—I believe Mr. Hendron is here today—I believe he spoke how clear the nearest private well is to the site, how close the nearest people are, and Mr. Hendron replied, "Oh, not within a mile." There are several families that reside within a mile of the NIES site, and one family is less than a quarter of a mile from NIES, and I would imagine he was pleasantly surprised if he heard that statement. It would seem after 2 years, Woodward-Clyde studying that site, that they might have seen the Mooreland family sitting over there.

I have included a chronology of contamination for your study. I will not read it, but I will point out that it does clearly show that there was ample warning of the failure of the NIES site, and the NIES monitoring wells began to show rising levels of inorganic contamination within a year after the site opened. This was the red light, the warning bell. It was ignored, and then organic contamination in 1980 was found and it was excused as accidental, and we don't know who or what to believe any more, so we have to do it ourselves.

We are angry. We are tired. It's been a big expense. And I'm going to close this now by—I'm going to close my statement with a public petition to the U.S. Environmental Protection Agency to declare the National Industrial Environmental Services Hazardous Waste Disposal Facility an imminent and substantial endangerment to the public health and environment under section 7003 of the Resource Conservation and Recovery Act, in light of the fact area wells, area private residence wells have shown contamination in their water.

I would further request that EPA immediately order a complete groundwater evaluation for all parameters of waste that have been disposed of at the NIES facility to include all homes within at least a 1-mile area of the site, at least that distance.

I have spoken with people of the Robert S. Kerr Environmental Research Lab at Ada, Okla., and they have assured me that a request from Regional Administrator Morris Kay will facilitate such a study. I didn't do this in time to get copies made for you.

The NIES site has been submitted as a Superfund site. It ranks third worst in the State of Kansas. It has been formally submitted to the U.S. Environmental Protection Agency. I called yesterday. Their new list is not out, but this is formally done. We don't just write it up and send it in. We had an attorney do it. And it is ranked as third worst in the State of Kansas.

Thank you.

[The prepared statement of Mrs. Dienst follows:]

STATEMENT OF
SHARILYN DIENST
BEFORE THE
SUBCOMMITTEE ON NATURAL RESOURCES, AGRICULTURE RESEARCH AND ENVIRONMENT
COMMITTEE ON SCIENCE AND TECHNOLOGY
HOUSE OF REPRESENTATIVES

JULY 30, 1983

Mr. Chairman, and members of the Subcommittee. My name is Sharilyn Dienst. My home is four miles from the N.I.E.S. hazardous waste landfill. I am grateful for this opportunity to address you.

Groundwater is a precious resource. Legalized chemical dumping, or landfilling, has forever ruined that resource for the people in my community.

The landfilling of hazardous waste is the only time-tested disposal method in use. Time has proven, without any doubt, that landfilling does not work. By siting a toxic waste landfill, you are selecting a group of citizens and telling them that they are going to bear the burden of responsibility for everyone's toxic offage, at the expense of their health and property. You are, in effect, depriving them of their basic human rights.

The NIES landfill is a classic example that clay liners do not work. We are now being told that technical redesign of the NIES site will make it workable. This technical design consists of a 60 mil plastic liner. These plastic liners have been tried in various places throughout the United States, and have shown failure within months.

A recent EPA report of the NIES facility revealed that problems already have been found with the new synthetic liner installed in a pit. Inspectors noted reports of noncompliance with specifications, problems with liner inspection and integrity such as soft areas in the base of the liner, leaks and poor seams. The manufacturer of the liner in place at NIES will not even guarantee the safety of its own product.

The Environmental Protection Agency published their conclusion in the February 5, 1981 Federal Register that all landfills will leak eventually.

The practice of burying deadly chemicals in the earth is not state of the art. It's just the cheapest method of disposal for the generator and the multimillion dollar disposal companies. It is the most expensive for the environment.

It is within your power, gentlemen, to force a halt to this systematic poisoning of the groundwater of our nation. I urge you to do so at once. I just read in the newspaper of a call for a national groundwater policy. I quote: "Millions of people rely on groundwater for their drinking water and Congress must protect it from hazardous and other kinds of waste."

Waste Management, Inc., the owners of the NIES landfill, enjoy the reputation of being the world's largest disposal company. Their brochures are glossy illustrations of the latest technical innovations, and they espouse great concern for the environment. We would ask then, why does an environmentally concerned company with such massive resources continue to use the outmoded practice of landfilling of toxic waste?

WMI's financial reputation is well-known. Their environmental reputation is being questioned across the country. Citizens who have been endangered by other WMI leaking landfills are not afraid to say "NO MORE".

The citizens from the Furley area have led a pretty low-key opposition to reopening of the NIES site. But, let me assure you, that will not be the case if imminent signs of reopening the leaking landfill occur. We will not be forced into a position of again accepting the word of a company whose prime concern is money, or of depending upon the judgment calls of incompetent state officials.

The NIES landfill is not unique among landfills. NIES was a poorly studied, poorly developed, poorly operated and poorly monitored experiment by the owners and the Kansas Department of Health and Environment. Both parties bear the blame for the irreversible groundwater contamination of an area that depended on private wells, and for the failure to consider the effect the dump would have on the people.

A major problem for the people is that the State has had the lead responsibility for the NIES site. The citizens are the victims of a strange regulatory arrangement between EPA and KDHE. KDHE has been the victim of some of their own Division of Environment staff. When complaints or requests are made to EPA because it has been futile to address them to KDHE, we are usually reminded that KDHE has the lead.

From 1976, when the site was first proposed, to the present clean-up efforts from a failed site, certain key KDHE staff members have maintained a peculiar preoccupation with keeping the NIES site open, to the extent of withholding important information and reports from the EPA, other involved agencies and the citizens.

According to the Memorandum of Agreement between the EPA and KDHE, the two agencies are to maintain a partnership, with EPA having the authority and obligation to oversee the State's program. I hope you will address pointed questions to representatives of EPA as to just how satisfactory this partnership has been. There are many instances where the Division of Environment of KDHE has ignored EPA recommendations and failed to supply EPA with critical reports of analyses. This lack of cooperation has seriously impaired EPA's ability to exercise their mandate for the protection of the people and the environment.

Secretary Sabol has said that she will not consider any reopening of NIES until a proper clean-up plan is approved and in effect. WMI and some KDHE officials are satisfied that the dewatering trenches, the clay caps on the burial cells, and the new plastic lined pit have caused the site to stop leaking.

We question this seriously. Monitoring points on private property show contamination in greater levels than before the remedial operations began and much higher than when contamination was first detected. Some on-site wells have risen dramatically in levels ... one recently hit a high of twenty-one million parts per billion. KDHE officials and the Company weren't alarmed though. They said that was not unexpected.

Both of the aquifers are contaminated and the remedial efforts do not even address the B-level water table which supplies water to the area private wells.

A frequent comment from KDHE and the present owners is that no human health risk exists from the NIES site, and that there is no indication of contamination of area private wells.

I am going to read a partial list of organic chemical contaminants that can be found in the on-site NIES monitoring wells.

1,1,1 trichloroethane - dichloromethane - trichloromethane - 1,1,2,2 tetrachloroethylene - bromodichloromethane - bromoform - dibromochloromethane - tetrachloromethane - 3,3 dichlorobenzidine - bis (2-ethyl hexyl)phtalate - di-n-butyl phtalate - diethyl phtalate - methylene chloride - toluene - dibenzo GHI perylene - dibenzo AH anthracene - 2-chlorophenol - chloroethane - methyl bromide

All of these chemicals have also been detected in five private wells near the NIES site.

Various explanations have been offered by KDHE for the presence of these contaminants. Perhaps they are valid explanations, but we don't know. We don't really know how many chemicals are in any of the monitored wells because of KDHE's insufficient monitoring.

There are over 700 separate chemical waste components disposed of at NIES, and only 26 are tested for routinely. A very small set of parameters is included in the monitoring efforts.

Recently EPA did tests for dioxin. NIES has buried suspected dioxin-contaminated wastes in all areas of the site. I would like to have EPA address ~~this sampling~~ effort as to how many wells were tested and which wells were tested. The citizens are very concerned about this.

Recently a State legislative committee member asked WMI's consultant representative from Woodward Clyde how close the nearest private well is to the site. Mr. Hendren replied "Oh, not within a mile." There are fourteen families that reside within a mile of the NIES site and one family is less than a quarter of a mile from NIES. I was dismayed that after two years of studying that area, Woodward Clyde people have not noticed any residences in the vicinity.

I have included a chronology of contamination for your study. I will not read it, but I will point out that it does clearly show that there was ample warning of the failure of the NIES site.

The NIES monitoring wells began to show rising levels of inorganic contamination within a year after the site opened. This was the red light...the warning bell. But it was ignored. The organic contamination in 1980 was excused as accidental.

We don't know who or what to believe anymore, and we are angry. We have had to become overnight students of chemistry, geology, hydrology, government, law and politics just to protect ourselves. It's been a very expensive and time consuming ordeal.

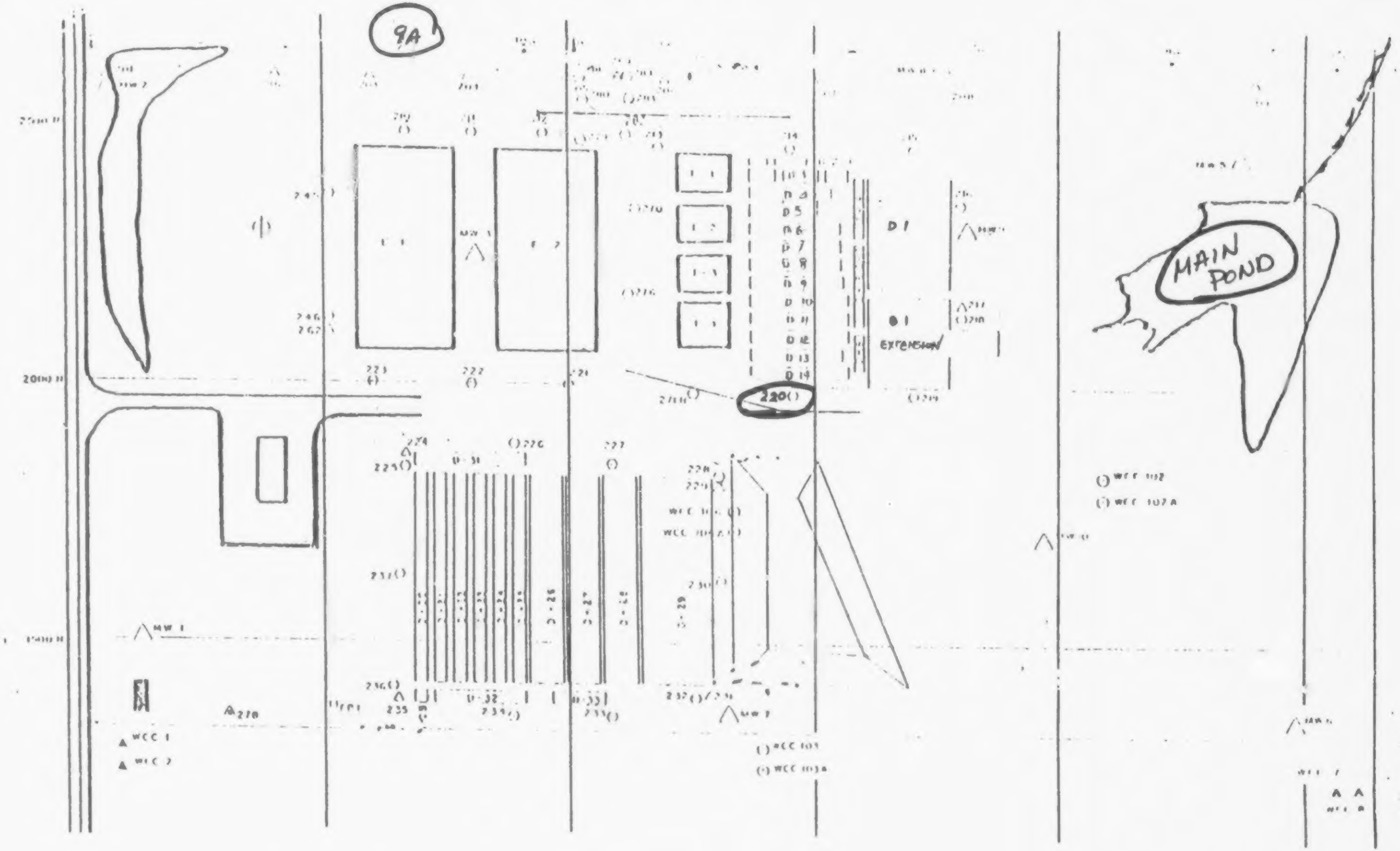
I am going to close my statement with a public petition to the United States Environmental Protection Agency to declare the National Industrial Environmental Services hazardous waste disposal facility an imminent and substantial endangerment to the public health and environment under Section 7003 of the Resource Conservation and Recovery Act. I would further request that the EPA immediately order a complete groundwater evaluation, for all parameters of wastes that have been disposed of at the NIES facility, to include all homes within at least a one-mile area of the site. I have spoken with the Robert S. Kerr Environmental Research Laboratory at Ada, Oklahoma and have been assured that a request from Regional Administrator Morris Kay will facilitate such a study. The citizens of the Furley area feel like the government owes this to them.

Thank you.

JANUARY 1978	Inorganic contamination shows steady rise in levels
SEPTEMBER 1979	EPA sampling at NIES revealed PCBs and 20 ppb of 1,1,2 trichloroethane in site Supply well
SEPTEMBER 1980	EPA analyses detected high levels of organic contamination in eight internal monitoring wells NIES management claimed the wells were contaminated the day prior to the EPA inspection by use of contaminated PVC pipe as part of bailer. THIS CLAIM WAS REFUTED BY EPA ANALYSIS OF PIPE.
OCTOBER 1981	EPA off-site analysis revealed chemical contamination in a spring one-half mile north of the site boundary. This report was not released by KDHE to citizens who had requested the sampling until a Freedom of Information Act request was filed with EPA.
DECEMBER 1981	SECOND SAMPLING CONFIRMED OFF-SITE CONTAMINATION
JANUARY 14, 1982	Perimeter wells at north edge of site confirm contamination moving north from the NIES site
JANUARY 18, 1982	NIES site closed by order of Governor
MARCH 1982	Reports surface showing contamination on south expansion acreage. The significance was denied by KDHE with explanations of: (1) contaminated water from on-site Supply well used for drilling piezometer wells and/or (2) drilling equipment was washed in contaminated water
DECEMBER 1982	Regulatory and Company officials meet at NIES and are pleased with remedial work
NOVEMBER 1982- FEBRUARY 1983	KDHE analyses show contamination again in southeast and southwest corners of expansion site
FEBRUARY 1983	CWMI notifies KDHE that all requested site improvement work completed and they are ready to reopen
APRIL 1983	KDHE analyses surface showing high contamination of southern boundary of existing site, dated August 1982..no follow-up testing and no report of this discovery to EPA
JULY 1983	KDHE issues computer analyses, showing more significant August 1982 contamination reports that have not been included in any of the summaries before. Some of the results are quite significant.

The attached map shows the placement of Well #220A that was referred to at the July 30 hearing. This is the well that EPA's contracted lab people were prevented from testing by Mr. Gray.

Also enclosed is a partial listing of probable dioxin-bearing wastes disposed of at NIES.


9A
MAIN POND
220()
D 1
B 1
EXTENSION
D 4
D 5
D 6
D 7
D 8
D 9
D 10
D 11
D 12
D 13
D 14
221
222
223
224
225()
()226
227
228
229
230()
232()
235
236()
D-26
D-27
D-28
D-29
D-31
D-32
D-33
MW 1
MW 7
MW 6
WCC 1
WCC 2
WCC 102
WCC 102A
WCC 103
WCC 103A
A 270

```
                                    ************************************************************
                                    ** STATE OF KANSAS HAZARDOUS WASTE MANAGEMENT SYSTEM **
                                    ** WASTE COMPONENT SUMMARY BY TRT/STOR/DISP LOCATION **
                                    ************************************************************

WASTE COMPONENTS                          ID NO.      LOCATION    TOTAL IN CUBIC FEET                   PERCENT OF LOCATION TOTAL
DICHLOROANILINES-------------------------  UN1590 -----D17   ------       13.20000000 -------------------- 0.3%
DICHLOROANILINES-------------------------  UN1590 -----D10   ------       10.15000000 -------------------- 0.2%
DICHLOROBUTENE---------------------------  NA2924 -----D1A   ------      905.80000000 ------------------100.0%
DICHLOROPHENOL(2,4 AND 4,6)--------------  U081   -----D1B   ------       90.65000000 ------------------- 14.4%
DICHLOROPHENOL(2,4 AND 4,6)--------------  U081   -----D7    ------       88.13000000 ------------------- 14.0%
DICHLOROPHENOL(2,4 AND 4,6)--------------  U081   -----D9    ------       76.66000000 ------------------- 12.1%
DICHLOROPHENOL(2,4 AND 4,6)--------------  U081   -----D1AEX------       69.35500000 ------------------- 11.0%
DICHLOROPHENOL(2,4 AND 4,6)--------------  U081   -----D12   ------       51.18000000 -------------------- 8.1%
DICHLOROPHENOL(2,4 AND 4,6)--------------  U081   -----D14   ------       33.58000000 -------------------- 5.3%
DICHLOROPHENOL(2,4 AND 4,6)--------------  U081   -----D8    ------       30.80000000 -------------------- 4.8%
DICHLOROPHENOL(2,4 AND 4,6)--------------  U081   -----D1A   ------       30.24000000 -------------------- 4.8%
DICHLOROPHENOL(2,4 AND 4,6)--------------  U081   -----D13   ------       28.80000000 -------------------- 4.5%
DICHLOROPHENOL(2,4 AND 4,6)--------------  U081   -----D18   ------       17.67000000 -------------------- 2.8%
DICHLOROPHENOL(2,4 AND 4,6)--------------  U081   -----D11   ------       17.64000000 -------------------- 2.8%
DICHLOROPHENOL(2,4 AND 4,6)--------------  U081   -----D19   ------       15.03000000 -------------------- 2.3%
DICHLOROPHENOL(2,4 AND 4,6)--------------  U081   -----D10   ------       12.6400[illegible] -------------------- 2.0%
DICHLOROPHENOL(2,4 AND 4,6)--------------  U081   -----D23   ------       12.0400[illegible] -------------------- 1.9%
DICHLOROPHENOL(2,4 AND 4,6)--------------  U081   -----D28   ------       10.2800[illegible] -------------------- 1.6%
DICHLOROPHENOL(2,4 AND 4,6)--------------  U081   -----D27   ------        9.68000[illegible] -------------------- 1.5%
DICHLOROPHENOL(2,4 AND 4,6)--------------  U081   -----D22   ------        7.12000[illegible] -------------------- 1.1%
DICHLOROPHENOL(2,4 AND 4,6)--------------  U081   -----D29A  ------        7.040000[illegible] -------------------- 1.1%
DICHLOROPHENOL(2,4 AND 4,6)--------------  U081   -----D24   ------        6.760000[illegible] -------------------- 1.0%
DICHLOROPHENOL(2,4 AND 4,6)--------------  U081   -----D26   ------        5.60000000 -------------------- 0.8%
DICHLOROPHENOL(2,4 AND 4,6)--------------  U081   -----D29   ------        5.28000000 -------------------- 0.8%
DICHLOROPHENOL(2,4 AND 4,6)--------------  U081   -----D5    ------        2.03000000 -------------------- 0.3%
DICHLOROPHENOL(2,4 AND 4,6)--------------  U081   -----D25   ------        0.56000000 -------------------- 0.0%
DICHLOROPHENOL(2,6)----------------------  U082   -----D7    ------       88.13000000 ------------------- 17.8%
DICHLOROPHENOL(2,6)----------------------  U082   -----D9    ------       76.66000000 ------------------- 15.5%
DICHLOROPHENOL(2,6)----------------------  U082   -----D12   ------       51.18000000 ------------------- 10.3%
DICHLOROPHENOL(2,6)----------------------  U082   -----D14   ------       33.58000000 -------------------- 6.8%
DICHLOROPHENOL(2,6)----------------------  U082   -----D8    ------       30.80000000 -------------------- 6.2%
DICHLOROPHENOL(2,6)----------------------  U082   -----D1A   ------       30.24000000 -------------------- 6.1%
DICHLOROPHENOL(2,6)----------------------  U082   -----D13   ------       28.80000000 -------------------- 5.8%
DICHLOROPHENOL(2,6)----------------------  U082   -----D1B   ------       20.00000000 -------------------- 4.0%
DICHLOROPHENOL(2,6)----------------------  U082   -----D18   ------       17.67000000 -------------------- 3.5%
DICHLOROPHENOL(2,6)----------------------  U082   -----D11   ------       17.64000000 -------------------- 3.5%
DICHLOROPHENOL(2,6)----------------------  U082   -----D19   ------       15.03000000 -------------------- 3.0%
DICHLOROPHENOL(2,6)----------------------  U082   -----D10   ------       12.64000000 -------------------- 2.5%
DICHLOROPHENOL(2,6)----------------------  U082   -----D23   ------       12.04000000 -------------------- 2.4%
DICHLOROPHENOL(2,6)----------------------  U082   -----D28   ------       10.28000000 -------------------- 2.0%
DICHLOROPHENOL(2,6)----------------------  U082   -----D1AEX------       10.00000000 -------------------- 2.0%
DICHLOROPHENOL(2,6)----------------------  U082   -----D27   ------        9.68000000 -------------------- 1.9%
DICHLOROPHENOL(2,6)----------------------  U082   -----D29A  ------        7.04000000 -------------------- 1.4%
DICHLOROPHENOL(2,6)----------------------  U082   -----D24   ------        6.76000000 -------------------- 1.3%
DICHLOROPHENOL(2,6)----------------------  U082   -----D26   ------        5.60000000 -------------------- 1.1%
DICHLOROPHENOL(2,6)----------------------  U082   -----D29   ------        5.28000000 -------------------- 1.0%
DICHLOROPHENOL(2,6)----------------------  U082   -----D5    ------        2.03000000 -------------------- 0.4%
DICHLOROPHENOL(2,6)----------------------  U082   -----D22   ------        1.72000000 -------------------- 0.3%
DICHLOROPHENOL(2,6)----------------------  U082   -----D25   ------        0.56000000 -------------------- 0.1%
DICHLOROPHENYLMETHANE--------------------  U017   -----D1A   ------        3.02000000 ------------------- 97.7%
```

```
                                   ********************************************************
                                   ** STATE OF KANSAS HAZARDOUS WASTE MANAGEMENT SYSTEM **
                                   ** WASTE COMPONENT SUMMARY BY TRT/STOR/DISP LOCATION **
                                   ********************************************************

WASTE COMPONENTS                               ID NO.      LOCATION   TOTAL IN CUBIC FEET                    PERCENT OF LOCATION TOTAL
2,2-DICHLOROBUTYROLACTONE  ----------------------------------D27   ------        13.60000000 ------------------- 24.3%
2,2-DICHLOROBUTYROLACTONE  ----------------------------------D29A ------        13.60000000 ------------------- 24.3%
2,2-DICHLOROBUTYROLACTONE  ----------------------------------D29   ------         6.60000000 ------------------- 11.8%
2,2-DICHLOROBUTYROLACTONE  ----------------------------------D24   ------         2.20000000 -------------------  3.9%
2,3,4-TRIMETHYL HEXANE---------------------------------------D26   ------         3.06571200 ------------------- 63.0%
2,3,4-TRIMETHYL HEXANE---------------------------------------D27   ------         1.79540400 ------------------- 36.9%
2,4-D--------------------------------------------------------D9    ------     1,426.20000000 ------------------- 37.3%
2,4-D--------------------------------------------------------D12   ------       964.90000000 ------------------- 25.2%
2,4-D--------------------------------------------------------D14   ------       601.20000000 ------------------- 15.7%
2,4-D--------------------------------------------------------D19   ------       300.60000000 -------------------  7.8%
2,4-D--------------------------------------------------------D18   ------       300.60000000 -------------------  7.8%
2,4-D--------------------------------------------------------D1B   ------        70.65000000 -------------------  1.8%
2,4-D--------------------------------------------------------D25   ------        58.20000000 -------------------  1.5%
2,4-D--------------------------------------------------------D20   ------        48.44510000 -------------------  1.2%
2,4-D--------------------------------------------------------D27   ------        46.00000000 -------------------  1.2%
2,4-D-------------------------------------  U240     -----D13   ------        12.00000000 ------------------- 39.8%
2,4-D-------------------------------------  U240     -----D12   ------        11.34000000 ------------------- 37.6%
2,4-D-------------------------------------  U240     -----D11   ------         5.74000000 ------------------- 19.0%
2,4-D--------------------------------------------------------D22   ------         5.56570000 -------------------  0.1%
2,4-D-------------------------------------  U240     -----D22   ------         1.03000000 -------------------  3.4%
2,4-D-------------------------------------  U240     -----E2    ------         0.00080400 -------------------  0.0%
2,4-D--------------------------------------------------------D29A ------         0.00003300 -------------------  0.0%
2,4-DIMETHYL PYRIDINE (LUTIDINE)-----------------------------D7    ------        12.59000000 ------------------- 72.8%
2,4-DIMETHYL PYRIDINE (LUTIDINE)-----------------------------D8    ------         4.40000000 ------------------- 25.4%
2,4-DIMETHYL PYRIDINE (LUTIDINE)-----------------------------D5    ------         0.29000000 -------------------  1.6%
2,4,5-T-----------------------------------  U232     -----D1B   ------        94.20000000 ------------------- 92.1%
2,4,5-T-----------------------------------  U232     -----D22   ------         7.20000000 -------------------  7.0%
2,4,5-T-----------------------------------  U232     -----D20   ------         0.78690000 -------------------  0.7%
2,4,5-TP SILVEX----------------------------------------------D12   ------        58.90000000 ------------------- 44.1%
2,4,5-TP SILVEX----------------------------------------------D25   ------        58.20000000 ------------------- 43.6%
2,4,5-TP SILVEX----------------------------------------------D9    ------        16.20000000 ------------------- 12.1%
2,4,5-TP SILVEX----------------------------------------------D29A ------         0.00003300 -------------------  0.0%
2,6-D   -----------------------------------------------------D9    ------       235.00000000 ------------------- 40.0%
2,6-D   -----------------------------------------------------D12   ------       151.00000000 ------------------- 25.7%
2,6-D   -----------------------------------------------------D14   ------       100.20000000 ------------------- 17.0%
2,6-D   -----------------------------------------------------D19   ------        50.10000000 -------------------  8.5%
2,6-D   -----------------------------------------------------D18   ------        50.10000000 -------------------  8.5%
2,6-DIETHYLANILINE    ---------------------------------------D11   ------        24.90000000 ------------------- 91.8%
2,6-DIETHYLANILINE    ---------------------------------------D27   ------         2.20000000 -------------------  8.1%
2,6-DIETHYLPHENYLAZOMETHINE----------------------------------D11   ------        24.90000000 ------------------- 91.8%
2,6-DIETHYLPHENYLAZOMETHINE----------------------------------D27   ------         2.20000000 -------------------  8.1%
2,6,11-TRIMETHYL DOECANE   ----------------------------------E2    ------        82.67319900 ------------------- 96.2%
2,6,11-TRIMETHYL DOECANE   ----------------------------------D32   ------         2.71107200 -------------------  3.1%
2,6,11-TRIMETHYL DOECANE   ----------------------------------D20   ------         0.48704600 -------------------  0.5%
2ETHOXYETHYL ACETATE  ---------------------------------------D1A   ------        44.10000000 ------------------100.0%
3-BROMODECANE    --------------------------------------------E2    ------        75.83556600 ------------------- 96.2%
3-BROMODECANE    --------------------------------------------D32   ------         2.48684800 -------------------  3.1%
3-BROMODECANE    --------------------------------------------D20   ------         0.44676400 -------------------  0.5%
3-CHLOROPHENYL ISOCYANATE  ----------------------------------D1CEX------        16.05000000 ------------------- 55.0%
3-CHLOROPHENYL ISOCYANATE  ----------------------------------D1C   ------         9.19000000 ------------------- 31.5%
```

```
                                  ***********************************************************
                                  ** STATE OF KANSAS HAZARDOUS WASTE MANAGCMENT SYSTEM **
                                  ** WASTE COMPONENT SUMMARY BY TRT/STOR/DISP LOCATION **
                                  ***********************************************************

WASTE COMPONENTS                                    ID NO.      LOCATION    TOTAL IN CUBIC FEET                 PERCENT OF LOCATION TOTAL
SILVER----------------------------------------------------------D28  ------           0.71787640 --------------------   3.4%
SILVER----------------------------------------------------------D20  ------           0.52248600 --------------------   2.4%
SILVER----------------------------------------------------------D29  ------           0.44142352 --------------------   2.0%
SILVER----------------------------------------------------------D32  ------           0.43984000 --------------------   2.0%
SILVER----------------------------------------------------------D22  ------           0.21574118 --------------------   1.0%
SILVER----------------------------------------------------------D24  ------           0.21105887 --------------------   1.0%
SILVER----------------------------------------------------------D26  ------           0.19627417 --------------------   0.9%
SILVER----------------------------------------------------------D1C  ------           0.19543876 --------------------   0.9%
SILVER----------------------------------------------------------D10  ------           0.19369400 --------------------   0.9%
SILVER----------------------------------------------------------D1CEX------           0.17338690 --------------------   0.8%
SILVER----------------------------------------------------------D27  ------           0.16455005 --------------------   0.7%
SILVER----------------------------------------------------------D23  ------           0.13777864 --------------------   0.6%
SILVER----------------------------------------------------------D9   ------           0.12699974 --------------------   0.6%
SILVER----------------------------------------------------------D11  ------           0.12617835 --------------------   0.5%
SILVER----------------------------------------------------------D13  ------           0.12258483 --------------------   0.5%
SILVER----------------------------------------------------------D12  ------           0.11960349 --------------------   0.5%
SILVER----------------------------------------------------------T4   ------           0.11793639 --------------------   0.5%
SILVER----------------------------------------------------------D25  ------           0.09665098 --------------------   0.4%
SILVER----------------------------------------------------------D29A ------           0.09605743 --------------------   0.4%
SILVER----------------------------------------------------------D2C  ------           0.09324000 --------------------   0.4%
SILVER----------------------------------------------------------D14  ------           0.05076064 --------------------   0.2%
SILVER----------------------------------------------------------D19  ------           0.04716805 --------------------   0.2%
SILVER----------------------------------------------------------D1A  ------           0.04170606 --------------------   0.1%
SILVER----------------------------------------------------------D3C  ------           0.03559271 --------------------   0.1%
SILVER----------------------------------------------------------D17  ------           0.02945480 --------------------   0.1%
SILVER----------------------------------------------------------D2A  ------           0.01709000 --------------------   0.0%
SILVER----------------------------------------------------------T2   ------           0.01114881 --------------------   0.0%
SILVER----------------------------------------------------------D6   ------           0.00521088 --------------------   0.0%
SILVER----------------------------------------------------------D16  ------           0.00459600 --------------------   0.0%
SILVER----------------------------------------------------------D21  ------           0.00269500 --------------------   0.0%
SILVER----------------------------------------------------------D1B  ------           0.00024160 --------------------   0.0%
SILVER----------------------------------------------------------D3B  ------           0.00015280 --------------------   0.0%
SILVER----------------------------------------------------------T3   ------           0.00001400 --------------------   0.0%
SILVEX------------------------------------------    U233    -----D13  ------          60.00000000 --------------------  39.8%
SILVEX------------------------------------------    U233    -----D12  ------          56.70000000 --------------------  37.6%
SILVEX------------------------------------------    U233    -----D11  ------          28.70000000 --------------------  19.0%
SILVEX------------------------------------------    U233    -----D22  ------           5.15000000 --------------------   3.4%
SODA ASH      --------------------------------------------------E2   ------         897.20000000 --------------------  84.8%
SODA ASH      --------------------------------------------------T4   ------         160.80000000 --------------------  15.1%
SODERING CHEMICALS    ------------------------------------------D3C  ------           7.65000000 --------------------100.0%
SODIUM ALUMINATE--------------------------------    UN2812  -----D8   ------          57.00000000 --------------------  31.8%
SODIUM ALUMINATE--------------------------------    UN2812  -----D1AEX------          34.47000000 --------------------  19.2%
SODIUM ALUMINATE--------------------------------    UN2812  -----D27  ------          33.60000000 --------------------  18.7%
SODIUM ALUMINATE--------------------------------    UN2812  -----D23  ------          17.46000000 --------------------   9.7%
SODIUM ALUMINATE--------------------------------    UN2812  -----D22  ------          13.92000000 --------------------   7.7%
SODIUM ALUMINATE--------------------------------    UN2812  -----D7   ------           9.72000000 --------------------   5.4%
SODIUM ALUMINATE--------------------------------    UN2812  -----D24  ------           6.63000000 --------------------   3.7%
SODIUM ALUMINATE--------------------------------    UN2812  -----D1A  ------           6.09000000 --------------------   3.4%
SODIUM ARSENATE    ---------------------------------------------D1A  ------          15.10000000 --------------------  97.7%
SODIUM ARSENATE    ---------------------------------------------D11  ------           0.35000000 --------------------   2.2%
```

```
                                        ****************************************************
                                        ** STATE OF KANSAS HAZARDOUS WASTE MANAGEMENT SYSTEM **
                                        ** WASTE COMPONENT SUMMARY BY TRT/STOR/DISP LOCATION **
                                        ****************************************************

WASTE COMPONENTS                              ID NO.      LOCATION   TOTAL IN CUBIC FEET           PERCENT OF LOCATION TOTAL
HEXACHLOROETHANE---------------------------- U131   -----D13  ------     30.95200000 -------------------  1.5%
HEXACHLOROETHANE---------------------------- U131   -----D18  ------     24.80400000 -------------------  1.2%
HEXACHLOROETHANE---------------------------- U131   -----D9   ------     21.83600000 -------------------  1.0%
HEXACHLOROETHANE---------------------------- U131   -----D23  ------     21.62400000 -------------------  1.0%
HEXACHLOROETHANE---------------------------- U131   -----D1AEX------     14.45770000 -------------------  0.7%
HEXACHLOROETHANE---------------------------- U131   -----D24  ------     10.81200000 -------------------  0.5%
HEXACHLOROETHANE---------------------------- U131   -----D25  ------      1.48400000 -------------------  0.0%
HEXACHLOROPHENE----------------------------- U132   -----D1A  ------  1,308.99999869 -------------------100.0%
HEXADECANE  ---------------------------------------------E2   ------    205.12899000 ------------------- 96.2%
HEXADECANE  ---------------------------------------------D32  ------      6.72672000 -------------------  3.1%
HEXADECANE  ---------------------------------------------D20  ------      1.20846000 -------------------  0.5%
HEXAMETHYLENEDIAMINE, LIQUID---------------- UN1783 -----D1AEX------    301.99999969 -------------------100.0%
HEXAMETHYLENEDIAMINE, SOLID----------------- UN2280 -----D26  ------    294.00000000 ------------------- 68.9%
HEXAMETHYLENEDIAMINE, SOLID----------------- UN2280 -----D1AEX------    132.50000000 ------------------- 31.0%
HEXANE-------------------------------------- UN1208 -----D12  ------    852.25000000 ------------------- 26.2%
HEXANE-------------------------------------- UN1208 -----D11  ------    581.75000000 ------------------- 17.9%
HEXANE-------------------------------------- UN1208 -----D23  ------    266.00000000 -------------------  8.1%
HEXANE-------------------------------------- UN1208 -----D22  ------    233.72500000 -------------------  7.1%
HEXANE-------------------------------------- UN1208 -----D1AEX------    223.07000000 -------------------  6.8%
HEXANE-------------------------------------- UN1208 -----D9   ------    220.25000000 -------------------  6.7%
HEXANE-------------------------------------- UN1208 -----D24  ------    200.56000000 -------------------  6.1%
HEXANE-------------------------------------- UN1208 -----D26  ------    178.20000000 -------------------  5.4%
HEXANE-------------------------------------- UN1208 -----D25  ------    169.79500000 -------------------  5.2%
HEXANE-------------------------------------- UN1208 -----D14  ------    161.12500000 -------------------  4.9%
HEXANE-------------------------------------- UN1208 -----D7   ------     62.95000000 -------------------  1.9%
HEXANE-------------------------------------- UN1208 -----D19  ------     44.12500000 -------------------  1.3%
HEXANE-------------------------------------- UN1208 -----D27  ------     30.33000000 -------------------  0.9%
HEXANE-------------------------------------- UN1208 -----D8   ------     22.00000000 -------------------  0.6%
HEXANE-------------------------------------- UN1208 -----D5   ------      1.45000000 -------------------  0.0%
HF        UN1052-----------------------------------------T4   ------  1,732.23157750 ------------------- 50.6%
HF        UN1052-----------------------------------------T2   ------    603.28000000 ------------------- 17.6%
HF        UN1052-----------------------------------------D1CEX------    322.95500000 -------------------  9.4%
HF        UN1052-----------------------------------------D1C  ------    289.52000000 -------------------  8.4%
HF        UN1052-----------------------------------------E2   ------    262.60000000 -------------------  7.6%
HF        UN1052-----------------------------------------D28  ------     82.25500000 -------------------  2.4%
HF        UN1052-----------------------------------------D1AEX------     34.67500000 -------------------  1.0%
HF        UN1052-----------------------------------------D29  ------     20.13000000 -------------------  0.5%
HF        UN1052-----------------------------------------T3   ------     14.77000000 -------------------  0.4%
HF        UN1052-----------------------------------------D3C  ------     14.70000000 -------------------  0.4%
HF        UN1052-----------------------------------------D24  ------     11.63500000 -------------------  0.3%
HF        UN1052-----------------------------------------D27  ------      8.39000000 -------------------  0.2%
HF        UN1052-----------------------------------------D1B  ------      6.21000000 -------------------  0.1%
HF        UN1052-----------------------------------------D26  ------      6.04000000 -------------------  0.1%
HF        UN1052-----------------------------------------D3B  ------      4.71000000 -------------------  0.1%
HF        UN1052-----------------------------------------D23  ------      2.45000080 -------------------  0.0%
HF        UN1052-----------------------------------------D10  ------      1.32000080 -------------------  0.0%
HF        UN1052-----------------------------------------D1A  ------      1.28500000 -------------------  0.0%
HF        UN1052-----------------------------------------D33  ------      1.00500000 -------------------  0.0%
HF        UN1052-----------------------------------------D18  ------      0.99000000 -------------------  0.0%
HF        UN1052-----------------------------------------D22  ------      0.40500000 -------------------  0.0%
```

```
******************************************************
** STATE OF KANSAS HAZARDOUS WASTE MANAGEMENT SYSTEM **
** WASTE COMPONENT SUMMARY BY TRT/STOR/DISP LOCATION **
******************************************************

WASTE COMPONENTS                                 ID NO.      LOCATION    TOTAL IN CUBIC FEET              PERCENT OF LOCATION TOTAL
CHLOROACETHYL CHLORIDE--------------------- UN1752 -----D29A ------          13.60000000 -------------------- 24.0%
CHLOROACETHYL CHLORIDE--------------------- UN1752 -----D27  ------          13.60000000 -------------------- 24.0%
CHLOROACETHYL CHLORIDE--------------------- UN1752 -----D29  ------           6.68000000 -------------------- 11.6%
CHLOROACETHYL CHLORIDE--------------------- UN1752 -----D24  ------           2.78000000 --------------------  4.9%
CHLOROACETHYL CHLORIDE--------------------- UN1752 -----D26  ------           0.14000000 --------------------  0.2%
CHLOROANILINES----------------------------- UN2018 -----D27  ------          43.00500000 -------------------- 60.4%
CHLOROANILINES----------------------------- UN2018 -----D26  ------          28.18200000 -------------------- 39.5%
CHLOROBUTYRONITRILE    ----------------------------------D27  ------           0.42700000 -------------------- 62.4%
CHLOROBUTYRONITRILE    ----------------------------------D24  ------           0.25700000 -------------------- 37.5%
CHLORODIBENZODIOXINS   ----------------------------------D1A  ------           0.02268000 -------------------- 18.0%
CHLORODIBENZODIOXINS   ----------------------------------D13  ------           0.02160000 -------------------- 17.2%
CHLORODIBENZODIOXINS   ----------------------------------D1B  ------           0.01500000 -------------------- 11.9%
CHLORODIBENZODIOXINS   ----------------------------------D11  ------           0.01323000 -------------------- 10.5%
CHLORODIBENZODIOXINS   ----------------------------------D10  ------           0.00948000 --------------------  7.5%
CHLORODIBENZODIOXINS   ----------------------------------D23  ------           0.00903000 --------------------  7.2%
CHLORODIBENZODIOXINS   ----------------------------------D1AEX------           0.00750000 --------------------  5.9%
CHLORODIBENZODIOXINS   ----------------------------------D24  ------           0.00507000 --------------------  4.0%
CHLORODIBENZODIOXINS   ----------------------------------D9   ------           0.00462000 --------------------  3.6%
CHLORODIBENZODIOXINS   ----------------------------------D12  ------           0.00441000 --------------------  3.5%
CHLORODIBENZODIOXINS   ----------------------------------D26  ------           0.00420000 --------------------  3.3%
CHLORODIBENZODIOXINS   ----------------------------------D14  ------           0.00264000 --------------------  2.1%
CHLORODIBENZODIOXINS   ----------------------------------D27  ------           0.002[illegible]9000 --------------------  1.7%
CHLORODIBENZODIOXINS   ----------------------------------D18  ------           0.00198000 --------------------  1.5%
CHLORODIBENZODIOXINS   ----------------------------------D22  ------           0.00129000 --------------------  1.0%
CHLORODIBENZODIOXINS   ----------------------------------D25  ------           0.00042000 --------------------  0.3%
CHLOROFORM--------------------------------- U044   -----D1A  ------          54.27939200 -------------------- 33.5%
CHLOROFORM--------------------------------- U044   -----E2   ------          25.70909000 -------------------- 15.8%
CHLOROFORM--------------------------------- U044   -----D1C  ------          22.72750000 -------------------- 14.0%
CHLOROFORM--------------------------------- U044   -----D11  ------          11.24037600 --------------------  6.9%
CHLOROFORM--------------------------------- U044   -----T4   ------           8.26367000 --------------------  5.1%
CHLOROFORM--------------------------------- U044   -----T2   ------           7.57741600 --------------------  4.6%
CHLOROFORM--------------------------------- U044   -----D27  ------           4.50248800 --------------------  2.7%
CHLOROFORM--------------------------------- U044   -----D13  ------           2.83780200 --------------------  1.7%
CHLOROFORM--------------------------------- U044   -----D1B  ------           2.51863100 --------------------  1.5%
CHLOROFORM--------------------------------- U044   -----D22  ------           2.48725100 --------------------  1.5%
CHLOROFORM--------------------------------- U044   -----D33  ------           2.47250100 --------------------  1.5%
CHLOROFORM--------------------------------- U044   -----D18  ------           2.38812900 --------------------  1.4%
CHLOROFORM--------------------------------- U044   -----D28  ------           2.22150000 --------------------  1.3%
CHLOROFORM--------------------------------- U044   -----D29A ------           1.95850000 --------------------  1.2%
CHLOROFORM--------------------------------- U044   -----D23  ------           1.93431900 --------------------  1.1%
CHLOROFORM--------------------------------- U044   -----D1AEX------           1.60750000 --------------------  0.9%
CHLOROFORM--------------------------------- U044   -----D26  ------           1.34400000 --------------------  0.8%
CHLOROFORM--------------------------------- U044   -----D12  ------           1.19293100 --------------------  0.7%
CHLOROFORM--------------------------------- U044   -----D29  ------           0.85650000 --------------------  0.5%
CHLOROFORM--------------------------------- U044   -----D25  ------           0.80500400 --------------------  0.4%
CHLOROFORM--------------------------------- U044   -----D24  ------           0.78588200 --------------------  0.4%
CHLOROFORM--------------------------------- U044   -----D9   ------           0.67700500 --------------------  0.4%
CHLOROFORM--------------------------------- U044   -----D10  ------           0.56306700 --------------------  0.3%
CHLOROFORM--------------------------------- U044   -----D14  ------           0.44044200 --------------------  0.2%
CHLOROFORM--------------------------------- U044   -----D1CEX------           0.29600000 --------------------  0.1%
```

```
                                        ********************************************************
                                        ** STATE OF KANSAS HAZARDOUS WASTE MANAGEMENT SYSTEM **
                                        ** WASTE COMPONENT SUMMARY BY TRT/STOR/DISP LOCATION **
                                        ********************************************************

WASTE COMPONENTS                                ID NO.      LOCATION    TOTAL IN CUBIC FEET                  PERCENT OF LOCATION TOTAL
PARANITPOPHENETOLE     ------------------------------------D11   ------          11.30000000 --------------------   2.1%
PARANITROPHENETOLE     ------------------------------------D24   ------           8.70000000 --------------------   1.6%
PARANITROPHENETOLE     ------------------------------------D22   ------           6.55000000 --------------------   1.2%
PARANITROPHENETOLE     ------------------------------------D12   ------           5.50000000 --------------------   1.0%
PARANITROPHENETOLE     ------------------------------------D14   ------           4.75000000 --------------------   0.9%
PARANITROPHENETOLE     ------------------------------------D13   ------           4.35000000 --------------------   0.8%
PARANITROPHENETOLE     ------------------------------------D1A   ------           4.35000000 --------------------   0.7%
PARANITROPHENETOLE     ------------------------------------D10   ------           3.25000000 --------------------   0.6%
PARANITROPHENETOLE     ------------------------------------D25   ------           1.10000000 --------------------   0.2%
PARAQUAT    -----------------------------------------------D29A  ------           0.14000000 -------------------100.0%
PARATHION, DIETHYL OR ETHYL----------------   P089    -----D23   ------          58.90000000 --------------------  72.5%
PARATHION, DIETHYL OR ETHYL----------------   P089    -----D25   ------          10.30000000 --------------------  12.6%
PARATHION, DIETHYL OR ETHYL----------------   P089    -----D20   ------           9.28000000 --------------------  11.4%
PARATHION, DIETHYL OR ETHYL----------------   P089    -----D29A  ------           2.76000000 --------------------   3.3%
PCB--------------------------------------------------------D18   ------           0.36465000 --------------------  55.5%
PCB--------------------------------------------------------D23EX------            0.14177153 --------------------  21.6%
PCB--------------------------------------------------------D20   ------           0.10492000 --------------------  15.9%
PCB--------------------------------------------------------D1A   ------           0.04193000 --------------------   6.3%
PCB--------------------------------------------------------D1AEX------            0.00118710 --------------------   0.1%
PCB--------------------------------------------------------D24   ------           0.00110286 --------------------   0.1%
PCB--------------------------------------------------------D29A  ------           0.00066000 --------------------   0.1%
PEANUT MEAL  ----------------------------------------------D7    ------         319.94375000 -------------------100.0%
PEANUT OIL   ----------------------------------------------D7    ------          64.37500000 -------------------100.0%
PENTACHLOROETHANE--------------------------   U184    -----D2A   ------          13.57500000 --------------------  52.4%
PENTACHLOROETHANE--------------------------   U184    -----D1A   ------           7.22100000 --------------------  27.9%
PENTACHLOROETHANE--------------------------   U184    -----D18   ------           1.25400000 --------------------   4.8%
PENTACHLOROETHANE--------------------------   U184    -----D12   ------           0.72900000 --------------------   2.8%
PENTACHLOROETHANE--------------------------   U184    -----D11   ------           0.50700000 --------------------   1.9%
PENTACHLOROETHANE--------------------------   U184    -----D14   ------           0.46200000 --------------------   1.7%
PENTACHLOROETHANE--------------------------   U184    -----D22   ------           0.46200000 --------------------   1.7%
PENTACHLOROETHANE--------------------------   U184    -----D13   ------           0.43800000 --------------------   1.6%
PENTACHLOROETHANE--------------------------   U184    -----D18   ------           0.35100000 --------------------   1.3%
PENTACHLOROETHANE--------------------------   U184    -----D9    ------           0.30900000 --------------------   1.1%
PENTACHLOROETHANE--------------------------   U184    -----D23   ------           0.30600000 --------------------   1.1%
PENTACHLOROETHANE--------------------------   U184    -----D24   ------           0.15300000 --------------------   0.5%
PENTACHLOROETHANE--------------------------   U184    -----D1AEX------            0.08700000 --------------------   0.3%
PENTACHLOROETHANE--------------------------   U184    -----D25   ------           0.02100000 --------------------   0.0%
PENTACHLOROPHENOL--------------------------   U242    -----D14   ------         392.78013501 --------------------  14.8%
PENTACHLOROPHENOL--------------------------   U242    -----D1A   ------         313.40000000 --------------------  11.8%
PENTACHLOROPHENOL--------------------------   U242    -----D13   ------         288.00000000 --------------------  10.8%
PENTACHLOROPHENOL--------------------------   U242    -----D18   ------         200.00000000 --------------------   7.5%
PENTACHLOROPHENOL--------------------------   U242    -----D1AEX------          183.09700000 --------------------   6.9%
PENTACHLOROPHENOL--------------------------   U242    -----D11   ------         176.40000000 --------------------   6.6%
PENTACHLOROPHENOL--------------------------   U242    -----D10   ------         126.40000000 --------------------   4.7%
PENTACHLOROPHENOL--------------------------   U242    -----D23   ------         120.40000000 --------------------   4.5%
PENTACHLOROPHENOL--------------------------   U242    -----D9    ------         108.60000000 --------------------   4.1%
PENTACHLOROPHENOL--------------------------   U242    -----D28   ------         102.80000000 --------------------   3.8%
PENTACHLOROPHENOL--------------------------   U242    -----D27   ------          97.36000000 --------------------   3.6%
PENTACHLOROPHENOL--------------------------   U242    -----D12   ------          89.00000000 --------------------   3.3%
PENTACHLOROPHENOL--------------------------   U242    -----D7    ------          88.13000000 --------------------   3.3%
```

```
*******************************************************
** STATE OF KANSAS HAZARDOUS WASTE MANAGEMENT SYSTEM **
** WASTE COMPONENT SUMMARY BY TRT/STOR/DISP LOCATION **
*******************************************************

WASTE COMPONENTS                                   ID NO.    LOCATION     TOTAL IN CUBIC FEET              PERCENT OF LOCATION TOTAL
PENTACHLOROPHENOL-------------------------------   U242   -----D29A ------      70.40000000 --------------------  2.6%
PENTACHLOROPHENOL-------------------------------   U242   -----D26  ------      68.10000000 --------------------  2.5%
PENTACHLOROPHENOL-------------------------------   U242   -----D24  ------      67.60000000 --------------------  2.5%
PENTACHLOROPHENOL-------------------------------   U242   -----D29  ------      52.80000000 --------------------  1.9%
PENTACHLOROPHENOL-------------------------------   U242   -----D18  ------      36.42000000 --------------------  1.3%
PENTACHLOROPHENOL-------------------------------   U242   -----D8   ------      30.00000000 --------------------  1.1%
PENTACHLOROPHENOL-------------------------------   U242   -----D22  ------      17.20000000 --------------------  0.6%
PENTACHLOROPHENOL-------------------------------   U242   -----D19  ------      10.02000000 --------------------  0.3%
PENTACHLOROPHENOL-------------------------------   U242   -----D25  ------       5.60000000 --------------------  0.2%
PENTACHLOROPHENOL-------------------------------   U242   -----D5   ------       2.83300000 --------------------  0.0%
PENTACOSANE ---------------------------------------------------E2   ------      70.24113900 -------------------- 96.2%
PENTACOSANE ---------------------------------------------------D32  ------       2.30339200 --------------------  3.1%
PENTACOSANE ---------------------------------------------------D20  ------       0.41300600 --------------------  0.5%
PERMETHRIN  ---------------------------------------------------D26  ------       0.08800000 --------------------100.0%
PEROXIDES   ---------------------------------------------------D1A  ------       0.41508000 -------------------- 40.7%
PEROXIDES   ---------------------------------------------------D18  ------       0.14446500 -------------------- 16.1%
PEROXIDES   ---------------------------------------------------D12  ------       0.10896500 -------------------- 10.6%
PEROXIDES   ---------------------------------------------------D13  ------       0.09953000 --------------------  9.7%
PEROXIDES   ---------------------------------------------------D3C  ------       0.04088500 --------------------  4.0%
PEROXIDES   ---------------------------------------------------D14  ------       0.03663000 --------------------  3.5%
PEROXIDES   ---------------------------------------------------D25  ------       0.03256000 --------------------  3.1%
PEROXIDES   ---------------------------------------------------D22  ------       0.03126500 --------------------  3.0%
PEROXIDES   ---------------------------------------------------D23  ------       0.02978500 --------------------  2.9%
PEROXIDES   ---------------------------------------------------D9   ------       0.01757500 --------------------  1.7%
PEROXIDES   ---------------------------------------------------D10  ------       0.01350500 --------------------  1.3%
PEROXIDES   ---------------------------------------------------D24  ------       0.01073000 --------------------  1.0%
PEROXIDES   ---------------------------------------------------D10  ------       0.00943500 --------------------  0.9%
PEROXIDES   ---------------------------------------------------D11  ------       0.00814000 --------------------  0.7%
PETROLEUM DISTILLATE ------------------------------------------D27  ------     132.72000000 -------------------- 18.6%
PETROLEUM DISTILLATE ------------------------------------------D26  ------      64.64000000 --------------------  9.0%
PETROLEUM DISTILLATE ------------------------------------------D22  ------      58.09000000 --------------------  8.1%
PETROLFUM DISTILLATE ------------------------------------------D18  ------      51.52000000 --------------------  7.2%
PETROLEUM DISTILLATE ------------------------------------------D23  ------      50.64000000 --------------------  7.1%
PETROLEUM DISTILLATE ------------------------------------------D24  ------      40.56000000 --------------------  5.6%
PETROLEUM DISTILLATE ------------------------------------------D13  ------      40.34000000 --------------------  5.6%
PETROLEUM DISTILLATE ------------------------------------------D12  ------      38.00000000 --------------------  5.3%
PETROLEUM DISTILLATE ------------------------------------------D1A  ------      37.64000000 --------------------  5.2%
PETROLEUM DISTILLATE ------------------------------------------D10  ------      32.04000000 --------------------  4.5%
PETROLEUM DISTILLATE ------------------------------------------D9   ------      25.04000000 --------------------  3.5%
PETROLEUM DISTILLATE ------------------------------------------D20  ------      23.56000000 --------------------  3.3%
PETROLEUM DISTILLATE ------------------------------------------D25  ------      23.42000000 --------------------  3.2%
PETROLEUM DISTILLATE ------------------------------------------D1AEX------      23.10000000 --------------------  3.2%
PETROLEUM DISTILLATE ------------------------------------------D14  ------      22.00000000 --------------------  3.1%
PETROLEUM DISTILLATE ------------------------------------------D18  ------      21.52000000 --------------------  3.0%
PETROLEUM DISTILLATE ------------------------------------------D11  ------      14.12000000 --------------------  1.9%
PETRCLEUM DISTILLATE ------------------------------------------D3C  ------      12.64000000 --------------------  1.7%
PEUTA-ESTER ROSIN----------------------------------------------D27  ------      83.96000000 --------------------100.0%
PHENOL FORMALDEHYDE -------------------------------------------D12  ------   1,166.83000000 -------------------- 27.5%
PHENOL FORMALDEHYDE -------------------------------------------D26  ------     733.30000000 -------------------- 17.3%
PHENOL FORMALDEHYDE -------------------------------------------D23  ------     592.49000000 -------------------- 14.0%
```

```
                                            ***********************************************************
                                            ** STATE OF KANSAS HAZARDOUS WASTE MANAGEMENT SYSTEM **
                                            ** WASTE COMPONENT SUMMARY BY TRT/STOR/DISP LOCATION **
                                            ***********************************************************

WASTE COMPONENTS                                  ID NO.      LOCATION    TOTAL IN CUBIC FEET                  PERCENT OF LOCATION TOTAL
TRICHLOROETHANE(1,1,1)----------------------      U226     -----D1AEX------       5.82000000 -------------------- 0.7%
TRICHLOROETHANE(1,1,1)----------------------      U226     -----D29  ------       4.44800000 -------------------- 0.5%
TRICHLOROETHYLENE---------------------------      U228     -----D1B  ------     541.03200000 -------------------- 51.2%
TRICHLOROETHYLENE---------------------------      U228     -----D22  ------     163.01100000 -------------------- 15.4%
TRICHLOROETHYLENE---------------------------      U228     -----D1A  ------     159.36500000 -------------------- 15.0%
TRICHLOROETHYLENE---------------------------      U228     -----D23  ------     101.42100000 -------------------- 9.6%
TRICHLOROETHYLENE---------------------------      U228     -----T2   ------      76.30000000 -------------------- 7.2%
TRICHLOROETHYLENE---------------------------      U228     -----D27  ------       8.10000000 -------------------- 0.7%
TRICHLOROETHYLENE---------------------------      U228     -----D1C  ------       6.60000000 -------------------- 0.6%
TRICHLOROETHYLENE---------------------------      U228     -----D33  ------       0.02618000 -------------------- 0.0%
TRICHLOROETHYLENE---------------------------      U228     -----D1AEX------       0.01505400 -------------------- 0.0%
TRICHLOROETHYLENE---------------------------      U228     -----E2   ------       0.00569400 -------------------- 0.0%
TRICHLOROFLUOROMETHANE----------------------      U229     -----D1AEX------       1.18710000 --------------------100.0%
TRICHLOROPHENOL(2,4,5)----------------------      U230     -----D14  ------     371.12000000 -------------------- 40.9%
TRICHLOROPHENOL(2,4,5)----------------------      U230     -----D1B  ------      90.65000000 -------------------- 9.9%
TRICHLOROPHENOL(2,4,5)----------------------      U230     --- -D7   ------      88.13000000 -------------------- 9.7%
TRICHLOROPHENOL(2,4,5)----------------------      U230     -----D9   ------      76.66000000 -------------------- 8.4%
TRICHLOROPHENOL(2,4,5)----------------------      U230     -----D12  ------      51.18000000 -------------------- 5.6%
TRICHLOROPHENOL(2,4,5)----------------------      U230     -----D8   ------      30.80000000 -------------------- 3.3%
TRICHLOROPHENOL(2,4,5)----------------------      U230     -----D1A  ------      30.24000000 -------------------- 3.3%
TRICHLOROPHENOL(2,4,5)----------------------      U230     -----D13  ------      28.80000000 -------------------- 3.1%
TRICHLOROPHENOL(2,4,5)----------------------      U230     -----D18  ------      17.67000000 -------------------- 1.9%
TRICHLOROPHENOL(2,4,5)----------------------      U230     -----D11  ------      17.64000000 -------------------- 1.9%
TRICHLOROPHENOL(2,4,5)----------------------      U230     -----D19  ------      15.03000000 -------------------- 1.6%
TRICHLOROPHENOL(2,4,5)----------------------      U230     -----D10  ------      12.64000000 -------------------- 1.3%
TRICHLOROPHENOL(2,4,5)----------------------      U230     -----D23  ------      12.04000000 -------------------- 1.3%
TRICHLOROPHENOL(2,4,5)----------------------      U230     -----D28  ------      10.28000000 -------------------- 1.1%
TRICHLOROPHENOL(2,4,5)----------------------      U230     -----D1AEX------      10.00000000 -------------------- 1.1%
TRICHLOROPHENOL(2,4,5)----------------------      U230     -----D27  ------       9.68000000 -------------------- 1.0%
TRICHLOROPHENOL(2,4,5)--  ------------------      U230     -----D22  ------       7.12000000 -------------------- 0.7%
TRICHLOROPHENOL(2,4,5)----------------------      U230     -----D29A ------       7.04000000 -------------------- 0.7%
TRICHLOROPHENOL(2,4,5)----------------------      U230     -----D24  ------       6.76000000 -------------------- 0.7%
TRICHLOROPHENOL(2,4,5)----------------------      U230     -----D26  ------       5.60000000 -------------------- 0.6%
TRICHLOROPHENOL(2,4,5)----------------------      U230     -----D29  ------       5.28000000 -------------------- 0.5%
TRICHLOROPHENOL(2,4,5)----------------------      U230     -----D5   ------       2.03000000 -------------------- 0.2%
TRICHLOROPHENOL(2,4,5)----------------------      U230     -----D25  ------       0.56000000 -------------------- 0.0%
TRICHLOROPHENOL(2,4,6)----------------------      U231     -----D14  ------     371.12000000 -------------------- 44.4%
TRICHLOROPHENOL(2,4,6)----------------------      U231     -----D7   ------      88.13000000 -------------------- 10.6%
TRICHLOROPHENOL(2,4,6)----------------------      U231     -----D9   ------      76.66000000 -------------------- 9.2%
TRICHLOROPHENOL(2,4,6)----------------------      U231     -----D12  ------      51.18000000 -------------------- 6.1%
TRICHLOROPHENOL(2,4,6)----------------------      U231     -----D8   ------      30.80000000 -------------------- 3.7%
TRICHLOROPHENOL(2,4,6)----------------------      U231     -----D1A  ------      30.24000000 -------------------- 3.6%
TRICHLOROPHENOL(2,4,6)----------------------      U231     -----D13  ------      28.80000000 -------------------- 3.4%
TRICHLOROPHENOL(2,4,6)----------------------      U231     -----D1B  ------      20.00000000 -------------------- 2.4%
TRICHLOROPHENOL(2,4,6)----------------------      U231     -----D18  ------      17.67000000 -------------------- 2.1%
TRICHLOROPHENOL(2,4,6)----------------------      U231     -----D11  ------      17.64000000 -------------------- 2.1%
TRICHLOROPHENOL(2,4,6)----------------------      U231     -----D19  ------      15.03000000 -------------------- 1.8%
TRICHLOROPHENOL(2,4,6)----------------------      U231     -----D10  ------      12.64000000 -------------  ----- 1.5%
TRICHLOROPHENOL(2,4,6)----------------------      U231     -----D23  ------      12.04000000 -------------    --- 1.4%
TRICHLOROPHENOL(2,4,6)----------------------      U231     -----D28  ------      10.28000000 -------------   ---- 1.2%
```

```
                                      **********************************************************
                                      ** STATE OF KANSAS HAZARDOUS WASTE MANAGEMENT SYSTEM **
                                      ** WASTE COMPONENT SUMMARY BY TRT/STOR/DISP LOCATION **
                                      **********************************************************

WASTE COMPONENTS                                         ID NO.     LOCATION    TOTAL IN CUBIC FEET
                                                                                                               PERCENT OF LOCATION TOTAL
TRICHLOROPHENOL(2,4,6)---------------------  U231    -----D1AEX------      10.00000000 --------------------  1.2%
TRICHLOROPHENOL(2,4,6)---------------------  U231    -----D27   ------      9.68000000 --------------------  1.1%
TRICHLOROPHENOL(2,4,6)---------------------  U231    -----D29A  ------      7.04000000 --------------------  0.8%
TRICHLOROPHENOL(2,4,6)---------------------  U231    -----D24   ------      6.76000000 --------------------  0.8%
TRICHLOROPHENOL(2,4,6)---------------------  U231    -----D26   ------      5.60000000 --------------------  0.6%
TRICHLOROPHENOL(2,4,6)---------------------  U231    -----D29   ------      5.28000000 --------------------  0.6%
TRICHLOROPHENOL(2,4,6)---------------------  U231    -----D5    ------      2.03000000 --------------------  0.2%
TRICHLOROPHENOL(2,4,6)---------------------  U231    -----D22   ------      1.72000000 --------------------  0.2%
TRICHLOROPHENOL(2,4,6)---------------------  U231    -----D25   ------      0.56000000 --------------------  0.0%
TRIETHANOLAMINE  ------------------------------------D17   ------    124.99999987 -------------------- 33.7%
TRIETHANOLAMINE  ------------------------------------D1AEX------    116.99999988 -------------------- 31.5%
TRIETHANOLAMINE  ------------------------------------D27   ------     43.99999995 -------------------- 11.8%
TRIETHANOLAMINE  ------------------------------------T2    ------     42.31000000 -------------------- 11.4%
TRIETHANOLAMINE  ------------------------------------E2    ------     12.04500000 --------------------  3.2%
TRIETHANOLAMINE  ------------------------------------T4    ------     10.80000000 --------------------  2.9%
TRIETHANOLAMINE  ------------------------------------D3C   ------     10.60000000 --------------------  2.8%
TRIETHANOLAMINE  ------------------------------------D24   ------      5.88000000 --------------------  1.5%
TRIETHANOLAMINE  ------------------------------------D28   ------      1.68000000 --------------------  0.4%
TRIETHANOLAMINE  ------------------------------------D11   ------      1.16000000 --------------------  0.3%
TRIETHYLAMINE---------------------------  UN1296 -----D11   ------    174.30000000 -------------------- 89.7%
TRIETHYLAMINE---------------------------  UN1296 -----D27   ------     19.60000000 -------------------- 10.0%
TRIETHYLAMINE---------------------------  UN1296 -----D1B   ------      0.07145000 --------------------  0.0%
TRIETHYLAMINE---------------------------  UN1296 -----D10   ------      0.03310000 --------------------  0.0%
TRIETHYLAMINE---------------------------  UN1296 -----D26   ------      0.03240000 --------------------  0.0%
TRIETHYLAMINE---------------------------  UN1296 -----D14   ------      0.02945000 --------------------  0.0%
TRIETHYLAMINE---------------------------  UN1296 -----D23   ------      0.02395000 --------------------  0.0%
TRIETHYLAMINE---------------------------  UN1296 -----D19   ------      0.01950000 --------------------  0.0%
TRIETHYLAMINE---------------------------  UN1296 -----D24   ------      0.01360000 --------------------  0.0%
TRIETHYLENE AMINE---------------------------------------T2    ------    824.04000000 --------------------100.0%
TRIETHYLENE GLYCOL    ----------------------------------T2    ------    823.98506400 --------------------100.0%
TRIMETHOXYBENZALDEHYDE----------------------------------D27   ------      9.15000000 -------------------- 34.9%
TRIMETHOXYBENZALDEHYDE----------------------------------D20   ------      7.29000000 -------------------- 27.8%
TRIMETHOXYBENZALDEHYDE----------------------------------D10   ------      3.51000000 -------------------- 13.4%
TRIMETHOXYBENZALDEHYDE----------------------------------D1A   ------      3.30000000 -------------------- 12.6%
TRIMETHOXYBENZALDEHYDE----------------------------------D13   ------      1.45000000 --------------------  5.5%
TRIMETHOXYBENZALDEHYDE----------------------------------D12   ------      1.45000000 --------------------  5.5%
TRIMETHYLAMINE CHLORIDE    -----------------------------D22   ------     66.90000000 -------------------- 81.2%
TRIMETHYLAMINE CHLORIDE    -----------------------------D26   ------     15.40000000 -------------------- 18.7%
TRIMETHYLAMMONIUM QUATERNARY SALT    -------------------D1A   ------    388.20000000 --------------------100.0%
TRIPHENYL PHOSPHATE    ---------------------------------D24   ------      0.35000000 --------------------100.0%
TRIPHOSPHONATE   ---------------------------------------D22   ------     28.97100000 -------------------- 80.5%
TRIPHOSPHONATE   ---------------------------------------D24   ------      6.99300000 -------------------- 19.4%
TRISODIUM PHOSHATE    ----------------------------------T3    ------    149.32000000 -------------------- 85.8%
TRISODIUM PHOSHATE    ----------------------------------T2    ------     24.65000000 -------------------- 14.1%
TRISODIUM PHOSPHATE    ---------------------------------T2    ------    703.45000000 -------------------- 77.8%
TRISODIUM PHOSPHATE    ---------------------------------E2    ------    130.65000000 -------------------- 14.4%
TRISODIUM PHOSPHATE,   ---------------------------------T4    ------     69.65000000 --------------------  7.7%
TROPICAL BLEACH  ---------------------------------------T4    ------    159.99999984 -------------------- 85.1%
TROPICAL BLEACH  ---------------------------------------D1A   -- ---     27.99999997 -------------------- 14.8%
UNDECANE     -------------------------------------------E2    ------    128.67182100 -------------------- 96.1%
```

```
                                       **********************************************************
                                       ** STATE OF KANSAS HAZARDOUS WASTE MANAGEMENT SYSTEM **
                                       ** WASTE COMPONENT SUMMARY BY TRT/STOR/DISP LOCATION **
                                       **********************************************************

WASTE COMPONENTS                                ID NO.     LOCATION    TOTAL IN CUBIC FEET               PERCENT OF LOCATION TOTAL
TERTIARY BUTYL ALCOHOL-------------------------------------D1A  ------         91.42000000 --------------------   9.3%
TERTIARY BUTYL ALCOHOL-------------------------------------D23  ------         86.56000000 --------------------   8.8%
TERTIARY BUTYL ALCOHOL-------------------------------------D26  ------         65.68000000 --------------------   6.7%
TERTIARY BUTYL ALCOHOL-------------------------------------D10  ------         64.08000000 --------------------   6.5%
TERTIARY BUTYL ALCOHOL-------------------------------------D13  ------         60.64000000 --------------------   6.2%
TERTIARY BUTYL ALCOHOL-------------------------------------D9   ------         50.08000000 --------------------   5.1%
TERTIARY BUTYL ALCOHOL-------------------------------------D20  ------         47.12000000 --------------------   4.8%
TERTIARY BUTYL ALCOHOL-------------------------------------D14  ------         44.16000000 --------------------   4.5%
TERTIARY BUTYL ALCOHOL-------------------------------------D18  ------         43.04000000 --------------------   4.4%
TERTIARY BUTYL ALCOHOL-------------------------------------D1AEX------         34.72000000 --------------------   3.5%
TERTIARY BUTYL ALCOHOL-------------------------------------D11  ------         28.24000000 --------------------   2.8%
TERTIARY BUTYL ALCOHOL-------------------------------------D3C  ------         25.28000000 --------------------   2.5%
TERTIARY BUTYL ALCOHOL-------------------------------------D27  ------         16.80000000 --------------------   1.7%
TETRA-ETHXLORTHOSILICATE    -------------------------------D17  ------         36.30000000 -------------------- 60.5%
TETRA-ETHXLORTHOSILICATE    -------------------------------D23  ------         23.65000000 -------------------- 39.4%
TETRACHLOROBENZENE(1,2,4,5,)---------------    U207    -----D28  ------          2.24000000 --------------------100.0%
TETRACHLOROETHYLENE-----------------------    U210    -----D21  ------      2,701.12000000 -------------------- 48.1%
TETRACHLOROETHYLENE-----------------------    U210    -----D20  ------      1,108.32000000 -------------------- 19.7%
TETRACHLOROETHYLENE-----------------------    U210    -----D8   ------      1,039.36000000 -------------------- 18.5%
TETRACHLOROETHYLENE-----------------------    U210    -----D7   ------        375.36000000 --------------------   6.6%
TETRACHLOROETHYLENE-----------------------    U210    -----D2A  ------        113.12500000 --------------------   2.0%
TETRACHLOROETHYLENE-----------------------    U210    -----D1A  ------         74.59900000 --------------------   1.3%
TETRACHLOROETHYLENE-----------------------    U210    -----D5   ------         51.84000000 --------------------   0.9%
TETRACHLOROETHYLENE-----------------------    U210    -----D16  ------         30.56000000 --------------------   0.5%
TETRACHLOROETHYLENE-----------------------    U210    -----D1C  ------         22.72750000 --------------------   0.4%
TETRACHLOROETHYLENE-----------------------    U210    -----D1B  ------         18.56400000 --------------------   0.3%
TETRACHLOROETHYLENE-----------------------    U210    -----D23  ------         15.77450000 --------------------   0.2%
TETRACHLOROETHYLENE-----------------------    U210    -----D12  ------          9.04400000 --------------------   0.1%
TETRACHLOROETHYLENE-----------------------    U210    -----D22  ------          7.18400000 --------------------   0.1%
TETRACHLOROETHYLENE-----------------------    U210    -----D11  ------          6.66500000 --------------------   0.1%
TETRACHLOROETHYLENE-----------------------    U210    -----D14  ------          6.31500000 --------------------   0.1%
TETRACHLOROETHYLENE-----------------------    U210    -----D18  ------          5.35800000 --------------------   0.0%
TETRACHLOROETHYLENE-----------------------    U210    -----D9   ------          4.92500000 --------------------   0.0%
TETRACHLOROETHYLENE-----------------------    U210    -----D13  ------          4.08800000 --------------------   0.0%
TETRACHLOROETHYLENE-----------------------    U210    -----D27  ------          3.43450000 --------------------   0.0%
TETRACHLOROETHYLENE-----------------------    U210    -----D1AEX------          3.01500000 --------------------   0.0%
TETRACHLOROETHYLENE-----------------------    U210    -----D24  ------          2.38100000 --------------------   0.0%
TETRACHLOROETHYLENE-----------------------    U210    -----D28  ------          2.22150000 --------------------   0.0%
TETRACHLOROETHYLENE-----------------------    U210    -----D26  ------          2.16300000 --------------------   0.0%
TETRACHLOROETHYLENE-----------------------    U210    -----D29A ------          1.95850000 --------------------   0.0%
TETRACHLOROETHYLENE-----------------------    U210    -----D25  ------          1.39200000 --------------------   0.0%
TETRACHLOROETHYLENE-----------------------    U210    -----D29  ------          0.85650000 --------------------   0.0%
TETRACHLOROETHYLENE-----------------------    U210    -----D10  ------          0.84000000 --------------------   0.0%
TETRACHLOROETHYLENE-----------------------    U210    -----D1CEX------          0.43600000 --------------------   0.0%
TETRACHLOROETHYLENE-----------------------    U210    -----T4   ------          0.02200000 --------------------   0.0%
TETRACHLOROPHENOL-2,3,4,6&2456------------    U212    -----D1A  ------        245.70000000 -------------------- 12.9%
TETRACHLOROPHENOL-2,3,4,6&2456------------    U212    -----D13  ------        234.00000000 -------------------- 12.3%
TETRACHLOROPHENOL-2,3,4,6&2456------------    U212    -----D1B  ------        162.50000000 --------------------   8.5%
TETRACHLOROPHENOL-2,3,4,6&2456------------    U212    -----D11  ------        143.32500000 --------------------   7.5%
TETRACHLOROPHENOL-2,3,4,6&2456------------    U212    -----D9   ------        120.55000000 --------------------   6.3%
```

```
                                        ********************************************************
                                        ** STATE OF KANSAS HAZARDOUS WASTE MANAGEMENT SYSTEM **
                                        ** WASTE COMPONENT SUMMARY BY TRT/STOR/DISP LOCATION **
                                        ********************************************************

WASTE COMPONENTS                               ID NO.       LOCATION     TOTAL IN CUBIC FEET              PERCENT OF LOCATION TOTAL
TETRACHLOROPHENOL-2,3,4,6&2456-------------   U212    -----D10   ------       102.70000000 -------------------- 5.4%
TETRACHLOROPHENOL-2,3,4,6&2456-------------   U212    -----D23   ------        97.82500000 -------------------- 5.1%
TETRACHLOROPHENOL-2,3,4,6&2456-------------   U212    -----D12   ------        93.07500000 -------------------- 4.9%
TETRACHLOROPHENOL-2,3,4,6&2456-------------   U212    -----D7    ------        88.13000000 -------------------- 4.6%
TETRACHLOROPHENOL-2,3,4,6&2456-------------   U212    -----D28   ------        83.52500000 -------------------- 4.4%
TETRACHLOROPHENOL-2,3,4,6&2456-------------   U212    -----D1AEX------        81.25000000 -------------------- 4.2%
TETRACHLOROPHENOL-2,3,4,6&2456-------------   U212    -----D27   ------        78.65000000 -------------------- 4.1%
TETRACHLOROPHENOL-2,3,4,6&2456-------------   U212    -----D14   ------        58.66000000 -------------------- 3.0%
TETRACHLOROPHENOL-2,3,4,6&2456-------------   U212    -----D29A  ------        57.20000000 -------------------- 3.0%
TETRACHLOROPHENOL-2,3,4,6&2456-------------   U212    -----D24   ------        54.92500000 -------------------- 2.9%
TETRACHLOROPHENOL-2,3,4,6&2456-------------   U212    -----D26   ------        45.50000000 -------------------- 2.4%
TETRACHLOROPHENOL-2,3,4,6&2456-------------   U212    -----D29   ------        42.90000000 -------------------- 2.2%
TETRACHLOROPHENOL-2,3,4,6&2456-------------   U212    -----D18   ------        36.48000000 -------------------- 1.9%
TETRACHLOROPHENOL-2,3,4,6&2456-------------   U212    -----D8    ------        30.80000000 -------------------- 1.6%
TETRACHLOROPHENOL-2,3,4,6&2456-------------   U212    -----D19   ------        15.03900000 -------------------- 0.7%
TETRACHLOROPHENOL-2,3,4,6&2456-------------   U212    -----D22   ------        13.97500000 -------------------- 0.7%
TETRACHLOROPHENOL-2,3,4,6&2456-------------   U212    -----D25   ------         4.55000000 -------------------- 0.2%
TETRACHLOROPHENOL-2,3,4,6&2456-------------   U212    -----D5    ------         2.03000000 -------------------- 0.1%
TETRAETHYL LEAD----------------------------   P110    -----E2    ------         8.04000000 --------------------100.0%
TETRAKIS (SEC) ORTHOSILICATE    -------------------------D22   ------         5.50000000 --------------------100.0%
TETRAKIS (2-ETHYL-BUTYL) ORTHOSILICATE    ---------------D1C   ------       105.60000000 -------------------- 45.4%
TETRAKIS (2-ETHYL-BUTYL) ORTHOSILICATE    ---------------D23   ------        65.40000000 -------------------- 28.1%
TETRAKIS (2-ETHYL-BUTYL) ORTHOSILICATE    ---------------D1AEX------        43.80000000 -------------------- 18.8%
TETRAKIS (2-ETHYL-BUTYL) ORTHOSILICATE    ---------------D19   ------        17.40000000 -------------------- 7.4%
TETRAKIS (2-ETHYLHEXYL) ORTHOSILICATE--------------------D14   ------        62.50000000 -------------------- 66.1%
TETRAKIS (2-ETHYLHEXYL) ORTHOSILICATE--------------------D19   ------        11.00000000 -------------------- 11.6%
TETRAKIS (2-ETHYLHEXYL) ORTHOSILICATE--------------------D23   ------         7.00000000 -------------------- 7.4%
TETRAKIS (2-ETHYLHEXYL) ORTHOSILICATE--------------------D22   ------         7.00000000 -------------------- 7.4%
TETRAKIS (2-ETHYLHEXYL) ORTHOSILICATE--------------------D10   ------         7.00000000 -------------------- 7.4%
TEXANOL--------------------------------------------------D1B   ------        91.11950000 -------------------- 17.6%
TEXANOL--------------------------------------------------D23   ------        88.35000000 -------------------- 17.0%
TEXANOL--------------------------------------------------D26   ------        55.37000000 -------------------- 10.7%
TEXANOL--------------------------------------------------D32   ------        52.30000000 -------------------- 10.1%
TEXANOL--------------------------------------------------D11   ------        51.78150000 -------------------- 10.0%
TEXANOL--------------------------------------------------D1A   ------        51.49900000 -------------------- 9.9%
TEXANOL--------------------------------------------------D12   ------        34.54600000 -------------------- 6.6%
TEXANOL--------------------------------------------------D3C   ------        25.38500000 -------------------- 4.9%
TEXANOL--------------------------------------------------D14   ------        22.80000000 -------------------- 4.4%
TEXANOL--------------------------------------------------D19   ------        14.84700000 -------------------- 2.8%
TEXANOL--------------------------------------------------D22   ------        12.22800000 -------------------- 2.3%
TEXANOL--------------------------------------------------D9    ------         5.50000000 -------------------- 1.0%
TEXANOL--------------------------------------------------D1AEX------         4.21200000 -------------------- 0.8%
TEXANOL--------------------------------------------------D17   ------         3.65000000 -------------------- 0.7%
TEXANOL--------------------------------------------------D24   ------         1.82200000 -------------------- 0.3%
TEXANOL--------------------------------------------------D27   ------         0.72900000 -------------------- 0.1%
TEXANOL--------------------------------------------------D25   ------         0.40800000 -------------------- 0.0%
TEXANOL--------------------------------------------------D10   ------         0.21000000 -------------------- 0.0%
TEXANOL--------------------------------------------------D13   ------         0.11050000 -------------------- 0.0%
TEXTILE AND RUBBER    -----------------------------------D24   ------     1,216.80000000 -------------------- 25.1%
TEXTILE AND RUBBER    -----------------------------------D26   ------     1,206.00000000 -------------------- 24.8%
```

This is the Kansas Legislative Post Audit report. Since the Auditor was supplied with some inadequate information, some of the answers were incorrect. Also attached is my response and that of Robert Morby, USEPA.

REGULATION AND CLEAN-UP OF THE FURLEY HAZARDOUS WASTE DISPOSAL SITE

SUMMARY OF LEGISLATIVE POST AUDIT'S FINDINGS

1. **Why was the August 1982 report of on-site contamination of wells in the southern and western sections of the site not made public before April 1983?** The Department of Health and Environment informed other agencies of the test results, but it did not attempt to make the information available to the public. It is not required by law or regulation to do so. Department officials said they did not bring the results to public attention because they thought the results were not significant and would possibly arouse unfounded public concern.

2. **Are present efforts to intercept the leakage off-site to the north successful?** Two trenches have been built on-site to drain contaminated ground water. They have reduced ground water levels and generally have reduced the level of contaminants in test wells, but it is not yet clear whether they are a final solution to containing contamination to the north. Further monitoring and testing will need to be done to determine whether additional measures are necessary.

3. **What can be done to contain any leakage to the south and west?** Department officials and engineering consultants think the present efforts to prevent contamination from spreading north will also keep it from spreading south and west. The trenches may be having an effect to the south and west, but monitoring of wells in these directions has not been sufficient to reach any firm conclusions.

4. **Has the Department of Health and Environment acted appropriately in regulating the Furley site?** In general, the Department has complied with laws and regulations. Many of its actions have been thorough. There are, however, several areas in which improvements can be made. The following problems were found: 1) regulatory decisions are not adequately documented, 2) some potential problems are not adequately responded to, and 3) communication with the public has not always been adequate. The Department has taken some steps to address these problems, and this report suggests others that might be taken.

5. **Will it ever be feasible for the Furley site to re-open?** The company operating the site and the consulting firm it employed to clean up the site say problems are being solved. The company wants to re-open the site before its new permit is reviewed, but the Department is taking no position until a clean-up plan is approved. All methods of hazardous waste disposal involve some risk of future leakage. Re-opening this site rests on whether the risk is acceptable.

6. **In the future, what should be the approach of the State in the matter of ground burial of hazardous waste?.** Three changes should be made if ground burial is used: 1) the Department should conduct rigorous independent tests of a proposed site's suitability rather than relying on the operator's consultant, 2) larger sites with an adequate buffer zone between disposal facilities and adjoining properties should be required, and 3) systematic ground water monitoring, covering all geographic sections of the site and its boundaries, should be maintained. More expensive but safer alternatives to ground burial should also be explored.

REGULATION AND CLEAN-UP OF THE FURLEY HAZARDOUS WASTE DISPOSAL SITE

At its April 21, 1983 meeting, the Legislative Post Audit Committee directed the Legislative Division of Post Audit to conduct a limited-scope performance audit of the Department of Health and Environment's regulation of the Furley hazardous waste disposal site. The purpose of this audit was to answer several specific questions about the success and status of clean-up efforts at the site, the appropriateness of the Department's regulatory actions, and the feasibility of reopening the site. Following a brief description of the background of the Furley site, each of the questions is answered below.

Background

In February 1977, the Kansas Department of Health and Environment issued a permit for the operation of the Furley hazardous waste disposal facility to store, treat, and dispose of hazardous wastes. The site encompasses 80 acres and is situated about 10 miles northeast of Wichita and about three miles southeast of the unincorporated community of Furley. The facility is operated by National Industrial Environmental Services, Incorporated, a subsidiary of Chemical Waste Management, Incorporated. Typical wastes which were received at the facility included acids, bases, paint sludge, heavy metal sludges, and organic chemicals from pesticides and other agricultural chemical production. A map showing the site and identifying key features is attached at the end of this report.

Since the opening of the site, local citizens living nearby have expressed concerns about the handling of the wastes at the site and the potential health hazards that would result if the wastes moved off-site. In January 1981, the federal Environmental Protection Agency (EPA) fined the facility for mishandling the disposal of certain wastes and cited several other operating deficiencies. In the fall of 1981, water samples from a spring discharging into Prairie Creek north of the site boundary showed slight levels of organic chemical contaminants. Because follow-up done to confirm this contamination indicated that it was moving off-site, the Department closed the site on January 18, 1982. The site has remained closed while the owners have worked on the clean-up of problems contributing to the off-site contamination.

Why Was the August 1982 Report of On-Site Contamination of Wells in the Southern and Western Sections of the Site Not Made Public Before April 1983?

In August 1982, the Department of Health and Environment tested a number of wells on and near the site. A series of four wells to the south and west of the southern barrel disposal trench was analyzed for contamination. This was the first time these four wells had been sampled for contamination, as they were dry when initially constructed in the spring of 1982. The Department decided to sample these wells as part of its periodic ground water monitoring activities, and it found contamination in each of the wells.

To some extent, agencies other than the Department were aware of the results. Since the site's closure, several parties have met periodically to discuss clean-up actions. These include officials from the Department, EPA, Kansas Geological Survey, and Sedgwick County Health Department. During these meetings, summary reports of lab tests on monitoring wells are distributed. Although no agency other than the Department receives the actual lab reports, these summaries are updated periodically and mailed to the other agencies or distributed when meetings are held on the cleanup. According to the Department, summaries of the well tests in question were distributed sometime in the fall or winter of 1982. As evidence supporting this, the Sedgwick County Health Department indicated to the auditors that they definitely received a copy sometime prior to the disclosures in April. In addition, although the EPA did not initially receive the reports on the four wells because of a clerical error, Health and Environment officials told the auditors that the EPA did receive these reports in December 1982.

The Department did not attempt to make the information available to the public. It is not required by law or regulation to routinely publicize lab report results, even when contamination is noted on the site. Department officials who were in charge of the site at the time of the August reports told the auditors that the Department did not generally present results of well monitoring samples to the public. Although this information was in files at the Department which are open to the public and was distributed to other interested agencies, officials said it was not brought directly to the public's attention because the Department felt the sampling results were not significant and would possibly arouse unfounded public concern. These officials stated that they were not surprised that contamination was found in this area, because earlier well tests in May 1982 also showed contamination.

The Secretary of Health and Environment has indicated that in the future, all lab reports showing levels of contamination will be analyzed in more depth. Written conclusions of the analyses will be prepared, and communications to the public will be improved. Additionally, all information sent to other agencies, such as the EPA, will be more fully documented to avoid any omissions of data in the future.

Are Present Efforts to Intercept the Leakage Off-Site to the North of the Site Successful?

After contamination was found off-site to the north and the facility was closed in January 1982. the operator of the facility employed an engineering consulting firm to develop a plan to clean up the site and contain future leakage. Various portions of this plan have been submitted to the Department since January 1982. In May 1982, the firm submitted a proposal outlining remedial actions which could be taken to intercept leakage to the north. The study stated that the apparent source of leakage was a zone of contamination migrating northward from the vicinity of a mound of ground water under the treatment ponds. To intercept the leakage from this area, the firm proposed construction of a drainage trench north of these ponds.

This plan was approved by Department officials and a test trench was constructed in August 1982. In October 1982, the consulting firm prepared a study documenting the effectiveness of the test trench for containment and retrieval of the migrating ground water. At that time, the firm recommended that the trench be extended and that an additional trench be constructed south of the treatment ponds because of the location of the ground water mound and the high levels of contamination in wells south of the treatment ponds. These trenches were constructed by December 1982.

According to the consulting firm, construction of the trenches has reduced ground water levels and generally decreased concentrations of contaminants in wells near the treatment ponds and just to the north of the site boundary. The auditors' review of the well samples confirms the consultant's conclusion that the water quality appears to be improving near the area of the treatment ponds. Nonetheless, using only two trenches may take a number of years. It has been estimated that up to one million gallons of liquid may need to be removed, but since the initial trench construction, only about 160,000 gallons have been removed over the nine-month period.

In conclusion, it is not yet clear whether the installation of the trench is a final solution to containing contamination to the north. Further monitoring and testing will need to be done to determine whether additional clean-up measures are necessary. Although it appears that the trenches are working as intended, it is not yet clear whether the trenches will have any effect on the contamination farther to the north off-site. The contaminated spring that resulted in the closure of the site still shows approximately the same levels of contamination, as do several wells between the trench and the spring. The operator has proposed to build an additional trench on the site if necessary. The EPA has proposed that this trench be built off-site near the spring to collect contaminated ground water and keep it from reaching Prairie Creek. The Department is working on its own clean-up plan and has not taken a position on this recommendation.

What Can Be Done to Contain any Leakage to the South and West?

Well samples show that there has been contamination to the south and the west of the site. The most significant contamination in these directions has occurred near the southern and western sides of the barrel disposal trenches. Department officials and the operator of the facility said they were not surprised to find this contamination and did not feel it was of special significance, because they had been aware of some contamination in this direction since at least May 1982.

Department officials and the engineering consultant both believe that contamination from the site is migrating in a northerly direction, because the ground slopes to that direction. However, they say the ground water mound has provided enough force to spread contamination in other directions on the site. They believe that this explains the contamination found to the south and west, and that although there may be leakage from the barrel trenches, it was primarily spread by the force of the ground water mound originating under the treatment ponds. They say that present efforts to contain the contamination from spreading beyond the treatment ponds to the north will also have the effect of intercepting the spread of contamination to the south and west.

Recent samples of the four wells to the south and west of the barrel trenches have found that two of these wells continue to show contamination, and two have since become dry. Although these results may be indications that the trench approach is having some effect in containing leakage in these directions, insufficient monitoring of these wells has been undertaken to reach any firm conclusions at this time. Other options to attempt to contain leakage to the south and west apparently will not be explored until conclusive results are obtained in the current clean-up efforts on the leakage from the treatment ponds.

One additional clean-up measure that the operator has taken to help reduce leakage from the barrel trenches is the recent placement of a clay cover over the barrel trenches. This cover is designed to reduce the absorption of rainfall into the barrel trenches. Such absorption could eventually cause further contamination of the ground water.

Has the Department of Health and Environment Acted Appropriately in Regulating the Furley Site?

The auditors' review of the Department's regulation focused on the time since the site was closed in January 1982. State and federal laws concerning hazardous waste regulation place few specific requirements upon the Department, and because the regulation of each site is unique, many decisions are left to the discretion of the Department. No water monitoring schedules are set out in regulations, and no time frames for clean-up plans are prescribed. In addition, no specific standards are available to determine whether contamination levels found are significant. In the absence of specific statutory requirements and standards, the auditors evaluated the Department's regulatory actions on the basis of general performance criteria for regulatory programs, such as timeliness and consistency of decisions, adequacy of documentation of actions, and responsiveness to public concerns.

Overall, the auditors found that the Department has acted in compliance with State laws and regulations. In addition, it has taken a number of actions to ensure that the site is adequately regulated. These include the following: conducting thorough technical reviews of all clean-up plans and water monitoring plans proposed by the operator; soliciting the technical advice and comments of State, local, and federal agencies and private engineering consultants with expertise in hazardous waste; establishing procedures to ensure that water samples are taken correctly; and ensuring that construction work is completed as planned. However, the auditors found that the Department has been deficient in several areas, and these deficiencies have limited the effectiveness of the regulatory program. Problems were found in three areas: inadequate documentation of regulatory decisions, lack of responsiveness to potential problems, and inadequate communication with the public.

Regulatory Decisions Have Been Inadequately Documented

Written documentation of regulatory decisions is necessary to effectively monitor and enforce compliance with these decisions. Such documentation should include specific actions to be taken, timetables for these actions, and any relevant performance criteria on which these actions will be evaluated.

Under the Solid and Hazardous Waste Act, the Secretary has the authority to issue orders specifying actions to be taken to prevent or remove any pollution or hazards. Further, the Act requires these orders to specify the timetable for the required actions. The auditors found inadequate documentation of a number of the decisions involving the site clean-up.

In analyzing the clean-up plan for the site, it was discovered that no completed, approved clean-up plan exists. In January 1982, the operator employed an engineering consulting firm to develop a clean-up plan. The consultant submitted major proposals in January, May, and December 1982. Other plans and studies have also been submitted relating to specific items such as trenches, injection wells, and water monitoring. The auditors found inadequate documentation to show that these plans had been approved, modified, or disapproved. Generally, plans received "conceptual approval" at meetings involving the Department, other agencies, the operator, and the consultant, but this approval was not documented with follow-up letters or written agreements.

In some cases, this inadequate documentation created a situation in which the company took action that was apparently contrary to what the Department requested. For example, in May 1982 the company proposed to drain the contaminated trench water and pump it into the evaporation ponds. The Secretary of the Department wrote to the company, stating that this action would be unacceptable and that the company should consider the construction of an injection well to dispose of this trench water. Nevertheless, the company pumped the contaminated trench water into the evaporation ponds, where it remains to this date. No documentation could be obtained from Department officials which showed that this action was approved, and it appears to be in direct conflict with what was requested by the Department in May 1982.

Other changes to the original clean-up plan differ substantially from initial concepts and timetables proposed by the company. While it is recognized that the clean-up process is in part a response to a dynamic situation, it appears that certain parts of the plan, or changes to it, were implemented without adequate documentation that the Department approved the plan. It is unclear what types of evaluations were undertaken by the Department and who made the decisions for various portions of the clean-up plan. In addition, other than issuing the order closing the facility, the Department has not exercised its statutory authority to issue orders specifying clean-up actions and time tables.

Recently, the Secretary of the Department created a multi-disciplinary team of Department officials to review all plans and proposals by the operator and develop a new clean-up plan. The Department has also contracted with a private engineering consulting firm to aid its review. Previously, no clean-up plan had been developed by the Department. Instead, it reacted to plans supplied by the company. The Secretary estimates that the clean-up plan now being developed by the Department should be completed in June 1983.

Potential Problems Were Not Adequately Responded To

Given the potential for harm to the public from contact with hazardous wastes and the high level of public concern about the Furley site, the

Department should be expected to closely monitor conditions at the site and respond quickly to potential problems. However, in several cases, the Department has not acted promptly to investigate and resolve potential problems. These cases primarily involve inadequate follow-up and analysis of water samples and are briefly described below.

Contaminated water samples were not followed up adequately. In November 1982, samples from two wells on the southern boundary of the site showed contamination. Although the levels of contamination were slight, Department officials stressed to the auditors that any contamination in these wells would be very unexpected and would require immediate action. Nonetheless, no action was taken by the Department to check these wells until April 1983, four months later. Upon sampling these wells in April, the Department found no contamination, and it was discovered that the earlier samples had been taken using contaminated sampling vials. Although it turned out that these wells were not contaminated, the Department had no way of knowing this until it tested the wells in April 1983. Thus, a four-month period elapsed in which the Department took no action to determine that there was no contamination in these wells.

Another case of well monitoring also illustrates the Department's lack of responsiveness to potential problem situations. Well 225, to the west of the southern barrel trench, had shown the highest contamination of any well on the site sampled to date. According to reports received by the Department, this well was checked only twice, both times in March 1982, and has not been sampled since that time. Moreover, there are no wells to the west of this well which could be sampled to indicate whether this high level of contamination is moving toward or off the western boundary.

In general, it appears that there may be too few sampling points at several key locations to sufficiently monitor potential problems of contaminants moving off-site. The auditors noted that because there are few usable wells between the wells immediately south of the barrel trench and the wells on the southern boundary of the site, it is difficult to analyze the possible spread of contamination to the south. It would appear desirable to know about contamination to the south before it reaches the boundary of the site. Additionally, there are few wells near the boundary of the site to the west of the southern barrel trench or on the eastern boundary of the site. It should be noted that the operator submitted a proposal for additional ground water monitoring in February 1983, and Department officials have indicated that they will be making significant changes to this plan to include additional monitoring near the boundaries to the west and east, as well as surrounding the new disposal cell.

Water samples were not analyzed adequately. Since the closure of the site there have been about 850 samples of various monitoring points on- and off-site. Until a recent order of the Secretary, the Department did not systematically analyze the results of these samples. Department officials received the lab reports and reviewed the levels of contamination but did not develop any written conclusions on the significance of the contamination and need for remedial action.

Because of the volume of the samples, manual review and analysis of trends is becoming increasingly difficult. The Department has placed the sample results on computer. However, the usefulness of this information on the computer is limited because the data is not verified and contains errors. Consequently, the primary officials involved in the regulation of the site rely on manual summary reports. These manual summary reports have several drawbacks. First, they do not provide a total of the concentrations of various contaminants found in the wells. This total level of contaminants is the primary benchmark that the Department, EPA, and other parties use to measure the level of contamination. Second, the summaries group the results in chronological order rather than by well. Thus, it is difficult to review the trends in individual wells without searching through large amounts of information.

The Department can improve its performance in this area by developing written conclusions on its lab reports. The Secretary has indicated that this will be done. The Department can also improve the quality of information it has on computer. Good computerized data would simplify the process of monitoring the test results.

Communication With the Public Has Not Been Adequate

To ensure that the public understands the significance of health hazards posed by the Furley site and the reasons for regulatory actions taken by the Department, it is important to maintain open, effective communication. When the site was closed in January 1982, the Secretary and the Governor held a news conference announcing the closure, the reasons for it, and the significance of the problem. In addition, news releases were sent to the media, and leaders of the nearby residents were contacted. Since that time, the contact by the Department with the public on the matter has primarily involved answering specific questions of nearby residents and the media.

Given the level of citizen concern and the criticism directed at Department officials, it would appear that the Department's communications with the residents near the site were not adequate to ensure that these citizens clearly understood the Department's actions. Other actions the Department could have taken to alleviate citizen concerns after the site closure include:

--Writing letters immediately after the site closure to each resident within several miles of the site explaining the significance of the problem and the actions the operator and Department planned to take to correct it.

--Periodically sending follow-up letters keeping the residents apprised of the progress on clean-up.

--Holding a forum for the residents to answer their questions on the clean-up plan, water monitoring and other issues of concern to the residents.

It should be noted that since November 1982, the Department has taken the position that the site will not be re-opened without a public hearing. In addition, the new Secretary has indicated that communications with the public on Department decisions and site conditions will be improved. As evidence of this, the Secretary has had two meetings with residents to discuss their concerns.

Will It Ever Be Feasible For the Furley Site to Re-Open?

The Secretary of the Department told the auditors that no action will be taken to re-open the site until a satisfactory clean-up plan is approved. The operator and its consultant have prepared a number of versions of a clean-up plan and have implemented most of the remedial clean-up actions proposed in these plans. In addition, the Department is currently preparing its own clean-up plan. Once a final clean-up plan is approved and the Department decides that it is working satisfactorily, the question of re-opening can be considered.

To comply with federal regulations, the operator must submit either a "Part B" permit application for site re-opening or a site closure plan by September 10, 1983. Sites approved under these new federal regulations will have to meet requirements significantly more stringent than current regulations. If the operator submits a new permit application, it will require approval by the Secretary of the Department, the EPA, and the State's Hazardous Waste Disposal Facility Approval Board. During this review process there also must be a public hearing to receive testimony from concerned citizens.

The operating company told the auditors that it is completing the new permit application and that it wants to re-open the site for solid waste disposal in the disposal cell currently under construction. In addition, it is exploring other options such as pre-treatment and disposal methods for liquid wastes. Because the Part B permit can take a number of months to approve, the company also indicated its desire to have the current suspension order lifted and to re-open the site for solid-waste disposal prior to the decision on the new permit. Under current regulations, the Department has the authority to allow this re-opening until the new permit is approved or denied.

The operator and its consultant maintain that the re-opening of the site would be prudent and would not present significant risks of further contamination. They believe, based on studies of the geology and hydrology of the site, that it is well suited for hazardous waste disposal. By contrast, individuals with the Kansas Geological Survey and the Wichita-Sedgwick County Health Department have raised concerns that the past ground water leakage problems and the hydrogeology of the site indicate a high potential for future leakage if the site is re-opened. The Department is not taking a position on the feasibility of re-opening the site until the cleanup plan has been approved.

If the site is re-opened, the primary disposal method the company currently plans to use is a solid waste disposal cell with soil, clay, and synthetic liners and a leachate collection system. The design of this new type of solid waste disposal cell is considered by hazardous waste experts to be much safer than the old methods of ground burial. Nonetheless, the long-term success of synthetic liners and leachate collection systems in containing hazardous waste is unknown. All methods of hazardous waste disposal involve some risk of leakage in the future. Consequently, the primary question that needs to be addressed in re-opening the site is whether the level of risk of a particular disposal method is acceptable.

In the Future, What Should Be the Approach of the State in the Matter of Ground Burial of Hazardous Waste?

The auditors identified three areas where the State can learn from its past experience and improve its future approach to the ground burial of hazardous waste. They are as follows:

—The Department should conduct rigorous independent tests of the suitability of the geology and hydrology of proposed sites, rather than relying on the operator's consultants for these tests.

—Larger sites with an adequate buffer zone between disposal facilities and adjoining properties should be required.

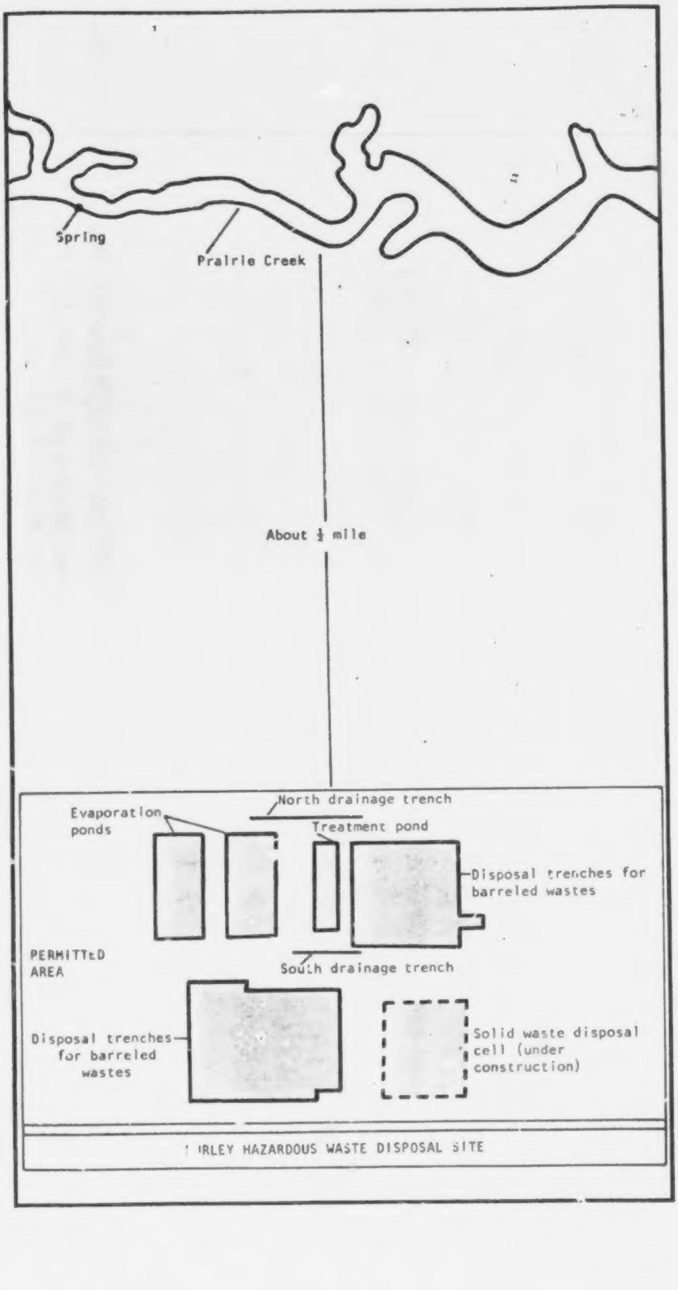
—Systematic ground water monitoring, covering all geographic sections of the site and its boundaries, should be required.

Given the past problems with ground burial of hazardous waste at the Furley site and similar problems nationwide, it appears that alternatives to ground burial should also be explored. According to a recent study by the U.S. Congress' Office of Technology Assessment, the future approach nationwide to hazardous waste disposal will focus on reducing ground burial disposal methods and exploring other alternatives. K.S.A. 1982 Supp. 65-3443(b) gives the Secretary, after weighing the economic impact, the authority to mandate alternative disposal methods if they are more environmentally desirable than ground burial.

The auditors contacted the Kansas Engineering Society to obtain an independent view by a group of technical experts on the future of ground burial of hazardous waste. The Kansas Society and National Society of Professional Engineers support the position that there should be "a national policy which would disallow land burial for materials that present a significant risk to the environment and for which economically achievable, environmentally sound alternatives exist." However, the Society recognizes that ground burial of hazardous waste will continue to be one of the methods of disposing of hazardous waste in the foreseeable future. For certain types of waste, there currently is no alternative technology available for treatment or disposal, or if the technology is available, it is not economically feasible.

A number of disposal technologies other than ground burial are available. These include various treatments to reduce the hazard levels of the waste, such as incineration, high temperature decomposition, and chemical stabilization. Although initial costs are high, such methods have proven to be highly effective in reducing hazard levels. It is also possible to reduce the generation of hazardous wastes at their source. Such methods would include source segregation or separation, process modification, end-product substitution, and in-plant recycling. Such techniques reduce levels of waste generated and may provide economic benefits to the producer in some instances through resource recovery.

In general, ground burial of hazardous waste is the least costly of all methods of disposal. However, in evaluating the costs of various alternatives, not only the initial capital outlay and operating costs of a particular technique should be examined but the future costs of potential clean-ups should also be considered. It is estimated by the Office of Technology Assessment that cleaning up a site from which there is leakage of hazardous waste "might cost 10 to 100 times the additional costs incurred today to prevent leakage of hazardous materials."


Spring
Prairie Creek
About ½ mile
North drainage trench
Evaporation ponds
Treatment pond
Disposal trenches for barreled wastes
PERMITTED AREA
South drainage trench
Disposal trenches for barreled wastes
Solid waste disposal cell (under construction)
FURLEY HAZARDOUS WASTE DISPOSAL SITE

20 June 1983
R. R. #1
Benton, Kansas
67017

Robert Miller, Chairman
Legislative Post Audit Committee
State Capitol Building
Topeka, Kansas

Dear Representative Miller:

Thank you for requesting that I receive a copy of the performance audit report concerning KDHE's regulation and clean up of the N.I.E.S. hazardous waste disposal facility.

I have reviewed the report and am quite concerned about some rather blatant inaccuracies and misinformations contained therein. May I offer the following comments to you.

1. WHY WAS THE AUGUST 1982 REPORT OF ON-SITE CONTAMINATION OF WELLS IN THE SOUTHERN AND WESTERN SECTIONS OF THE SITE NOT MADE PUBLIC BEFORE APRIL 1983?

Secretary Sabol has responded to this question and to the answers given by KDHE staff. I would add to the Secretary's statement that the southern and western contamination is highly significant. Until the disclosure of the August 1982 reports, KDHE and the company had maintained that the northerly plume of contamination was the problem area emanating from the Treatment ponds. At no time was any indication given that contamination had been detected in other areas, and as recently as February of 1983 WMI still maintained that the T-ponds are the source of contamination. In response to WMI's February 25 letter, Melville Gray of KDHE, concurred with WMI's analysis of the situation. I am enclosing both letters for your information. These letters were written six months after the August 1982 reports that showed wide-spread contamination south and west on-site. Since the company and the KDHE official deemed the remedial plan effective despite information to the contrary, I point out that Secretary Sabol has been quoted as saying any reopening of the NIES site depends on effective clean up.

2. ARE PRESENT EFFORTS TO INTERCEPT THE LEAKAGE OFF-SITE TO THE NORTH SUCCESSFUL?

No. April 1983 sampling analyses clearly show that test wells to the north are not generally lower in contamination. Twenty-six (26) of forty-four (44) tested wells showed increases in levels of contamination. The monitoring wells north of the site are steadily increasing in contamination levels. Six (6) of the nine (9) B-zone wells at the north boundary of NIES showed an increase. Well 249 is cited as showing a decrease attributed to the effectiveness of the dewatering trenches. Please note that the most dramatic decrease in this well was five months prior to installation of the remedial trenches.

249

3-05-82	41,763.0 ppb
3-12-82	97,630.0
3-31-82	69,462.0
8-12-82	33,645.3
4-20-83	7,944.9

THE AUDITOR'S REVIEW OF THE WELL SAMPLES CONFIRMS THE CONSULTANT'S CONCLUSION THAT WATER QUALITY APPEARS TO BE IMPROVING NEAR THE AREA OF THE TREATMENT PONDS.

Well 271R is directly south of the T-ponds and south of the remedial trench. Please note the following:

271R

3-30-82	7,587.0 ppb
4-01-82	13,554.0
4-22-83	86,020.0

A rise of 78,433 parts per billion total would indicate that the remedial trench is not working on the well closest to the T-ponds on the south.

221A

2-25-82	1,732.0 ppb
2-26-82	2,428.9
3-05-82	3,456.5
4-07-83	10,433.0

Well 221A is just west of well 271R and shows no positive effects of the remedial trenches..to the contrary, levels have more than tripled.

220A

3-12-82	754,249.1 ppb
3-23-82	725,375.9
4-21-83	21,554,700.0

Well #220 is south and east of the T-ponds and at the north edge of the south remedial trench. The 3,000% increase from March of 1982 to April of 1983 denotes an extremely significant problem with the north disposal trench and indicates worsening of the north disposal area. KDHE's internal study group concluded that this concentration was "not unexpected" and stated that the dewatering trenches were located and designed in anticipation of such release.

If this is the case, it seems that the enormous increase in contamination would have been detected in the dewatering trench wells rather than monitoring well 220A.

> WHAT CAN BE DONE TO CONTAIN ANY LEAKAGE TO THE SOUTH AND WEST?
> DEPARTMENT OFFICIALS AND ENGINEERING CONSULTANTS THINK THE PRESENT EFFORTS TO PREVENT CONTAMINATION FROM SPREADING NORTH WILL ALSO KEEP IT FROM SPREADING SOUTH AND WEST.

The KDHE response is that there has been contamination indicated on the south and west borders of the original site, however there has not been contaminant migration outside the original site and the 80-acre proposed site based on current lab data.

Assuming KDHE's response refers to south and west wells, it of course should be emphasized that there has been no testing south or west of the site and expansion site. An exception to this is the property of Roy Brown, west and north of NIES. Note the following history of the only west sampling point off-site.

Brown Well #1	None detected	5-24-82
Brown Well #2	None detected	5-24-82
Brown Well #3	0.7 ppb Dichloromethane	5-24-82
	0.5 ppb Trichloromethane	
Brown Well #1	None detected	8-23-82

It's good to know that Brown Well #1 did not become contaminated during the period from May to August of 1982. However, why wasn't the contaminated Well #3 retested?

I also point out that several area residence wells have shown contamination of the following chemicals: 1,1,1 Trichloroethane, Toluene, Trichloromethane, Tetrachloromethane, Bromodichloromethane, Dibromochloromethane, Bromoform, 1,1,2,2 Tetrachloroethylene, Dichloromethane, 1,1 Dichloroethane, 3,3 Dichlorobenzidine, Dibenzo (AH) Anthracene, Benzo (GHI) Perylene and some high concentrations of inorganics. The same chemicals are found in monitoring wells both on and off the NIES site, yet it is the consensus of health officials that no relation exists between chemical contamination of these nearly residence wells and the site itself.

In addition to the Department's suggestion of two monitoring points on the west side of the site plus two additional monitoring points on the east side, I would further suggest monitoring wells be installed north of the contaminated spring - south of 85th street and northeast of the existing site, adjacent to W273 and W254. Analyses seem to indicate a correlation between 273 and the Seep, while 260 and the Spring #6 tend to be similar. This may indicate separate channels of water flow, and if so, it would seem prudent to check for further channels east of these wells. As it now stands, the northeast is a large unmonitored area.

> SOUTH AND WEST WELLS - AUGUST 1982 REPORT
>
> TO SOME EXTENT, AGENCIES OTHER THAN THE DEPARTMENT WERE AWARE OF THE RESULTS. SINCE THE SITE'S CLOSURE, SEVERAL PARTIES HAVE MET PERIODICALLY TO DISCUSS CLEAN UP ACTIONS. THESE INCLUDE EPA, KGS AND SEDGWICK COUNTY HEALTH DEPT... SUMMARIES ARE UPDATED PERIODICALLY AND MAILED TO OTHER AGENCIES OR DISTRIBUTED WHEN MEETINGS ARE HELD ON THE CLEAN UP. ALTHOUGH EPA DID NOT INITIALLY RECEIVE THE REPORTS ON THE FOUR WELLS BECAUSE OF A CLERICAL ERROR, H&E OFFICIALS TOLD THE AUDITORS THAT THE EPA DID RECEIVE THESE REPORTS IN AUGUST OF 1982.

EPA officials deny receiving the August 1982 reports in question until after the disclosure of the contents was made public. As to other agencies being informed, the senior geologist of KGS was removed from the select advisory committee shortly after it was formed. The Sedgwick County official in whose county the site exists has not been included in many of the meetings and frequently did not receive reports or committee decisions.

> OFFICIALS STATED THAT THEY WERE NOT SURPRISED THAT CONTAMINATION WAS FOUND IN THIS AREA, BECAUSE EARLIER WELL TESTS IN MAY 1982 ALSO SHOWED CONTAMINATION.

This also refers to the south and west areas of the site. The May 1982 test analyses show no testing of wells anywhere near the south and western wells in question. Tests performed in May of 1982 were only for off-site north wells, on-site north wells, expansion site wells and one D-level well that did not show contamination on that date.

INADEQUATE DOCUMENTATION

KDHE response tends to be a matter of semantics and interpretation. I am enclosing a letter to Regional Administrator Morris Kay, EPA, detailing KDHE's lack of response to repeated suggestions and requests from EPA that fluids be removed from E-2, dating back to May 1982. I assume Secretary Harkins had the same idea in mind when he clearly stated that the E-ponds were not to be used for storage of fluids from remedial trenches. The point is obvious that E-2 was, and is, being viewed as a possible source of contamination of groundwater.

POTENTIAL PROBLEMS NOT RESPONDED TO

Contaminated water samples not followed up adequately was a concern of the auditors. The report refers to wells 272 and 277. This section is inaccurate in two areas. Wells 272 and 277 were found to be contaminated in November of 1982, however these wells had been sampled in subsequent monthly monitoring and had also been found to be contaminated during the months of November and December 1982, January and February of 1983, and W272 again in March of 1983. I am amazed at information given the auditors that would present such a totally inaccurate history of these wells, particularly the statement: "It was discovered that the earlier samples had been taken using contaminated sampling vials." This is a needless fabrication for an incident that didn't exist.

I would respectfully disagree with Secretary Sabol's response stating that the sampling history of these two wells does not indicate contaminants present in the groundwater on the expansion area. Well 272 showed reproducible chemical contamination of benzene, toluene, 1,1,1 trichloroethane as well as individual readings of 1,1,2,2 tetrachloroethylene, tetrachloromethane and trichloroethylene.

Well 277 showed toluene, in two consecutive readings plus individual detection of benzene, 1,1,1 trichloroethane, trichloromethane and bromomethane.

KGS-1 was not mentioned but in June and July of 1982, trichloromethane was detected. KGS-1 is situated directly between 272 and 277 on the south boundary of the expansion site.

The history of these expansion site wells clearly does not support the Department's position that there is no contamination to the south. Monitoring efforts skip from the southern edge of the existing site to the southern edge of the expansion site, and with the August 1982 report showing the southern edge of the existing site contaminated, there is obvious reason to believe the expansion reports.

WELL 225

KDHE"s response to the audit report that Well #225 had indeed been sampled in August of 1982 appears to be incorrect. From all monitoring reports that I have, the only testing of #225 were in March of 1982 - 958,959 ppb on March 22, 1982. I did inquire of KDHE about the August results on #225. One staff member was unable to locate the reading referred to in the

KDHE response, and another staff member advised me that there had been no tests of #225 in August. From this information and the data in my possession, I assume that the KDHE response is in error and that the Post Audit report is correct.

Other significant wells apparently not retested since March of 1982 are W203B with a reading of 2,100.6 ppb - 262B with a reading of 296.1 - 222A with a reading of 413,722.9 parts per billion. The B wells are important because contamination of all water zones monitored is now apparent.

COMMUNICATION WITH THE PUBLIC

We commend Secretary Sabol's openness and accessibility to the public, and her assurance that the Department and information will be accessible. Direct contact with Secretary Sabol has been satisfying. However some senior staff in the Division of Environment have tended not to be a part of this change. On May 4, 1983 I asked several questions of KDHE. The questions were submitted to James Aiken, chairman of the internal study committee, for response by the committee. After four weeks with no response, I was advised by a staff person at KDHE that Mr. Aiken had not presented my questions to the committee. I then asked Secretary Sabol for a response and she advised me that one will be forthcoming. This incident is highly reminiscent of Secretary Harkins' tenure when quite frequently criticism for matters such as this fell upon the Secretary when staff members were not responsive to the public. Unfortunately, this same attitude now tends to temper Secretary Sabol's progress in the Department's open communication with the public.

FEASIBILITY OF REOPENING

CWM's desire to reopen has been quite evident since the site was closed. The company first announced that they wanted to reopen the barrel trench areas while cleanup was being effected near the T-ponds. When Secretary Harkins refused, Mr. Gerald Kruszka of CWMI stated to the press that in this case, the clean up will be treated routinely. And it appears to be the case, when eighteen months later contamination levels off-site are steadily increasing.

I am enclosing for your information correspondence from CWM to Congressman William Patman of Texas stating reasons for withdrawal of application for permit at Bay City, Texas. You will note the striking similarities in geological and hydrological information between the Texas and Kansas sites, specifically the discontinuous layers of clay and sand and the inconsistent water level readings. The Furley site, also thought to be a massive, 90-foot thick clay formation, actually consists of layers of shale and gypsum. A fluctuating water table seems to cause monitoring wells to be dry every other Sampling, as is evident in March 1982-August 1982-April 1983-June 1983 testing. Department response concerning clean up concerns a December 1982 meeting with representatives of EPA, KGS, CH2M Hill, Sedgwick County and KDHE. The response cites optimism for the conclusion of the clean up project based on information available in December. I refer you to the August 1982 reports showing high contamination south and west on site. Some of the represented agencies were not aware of this information in December.

I appreciate this opportunity to comment on the Post Audit report. It is not my intent to only find fault, but rather to point out significant errors in the report, based on KDHE's reports of analyses.
If another meeting of the Post Audit Committee is held regarding this issue, I would request that citizens of this area be notified and that we be given an opportunity to address the Committee.

Sincerely

enclosures

Sharilyn Dienst

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VII
324 EAST ELEVENTH STREET
KANSAS CITY, MISSOURI 64106

JUN 29 1983

Glenn E. Deck
Director of Performance Audits
Legislative Division of Post Audit
Mills Building
Topeka, Kansas 66612

Dear Mr. Deck:

Thank you for sending me the draft and final copies of your audit report on the Furley hazardous waste site. I do wish to point out several inaccuracies in the reports, and to make additional comments for your information.

First, in Item 1 of the Summary and on page 2 of the report, you state that other agencies, including EPA, received the August 1982 monitoring data for wells 233, 234, 278, 246 and 237 prior to the newspaper reports in April 1983. This is incorrect; EPA did not receive these data until April 25, 1983, as we told you when you visited us. It now appears that the Wichita-Sedgwick County Health Department received the data only when they specifically requested an entire set of the summaries.

As the Kansas Department of Health and Environment (KDHE) indicated in their response number 3, the January 1981 EPA fine was in regard to storage, not disposal, of PCB wastes. Those specific wastes were not disposed of at National Industrial Environmental Services (NIES), but PCB materials were disposed of at NIES before that time.

To our knowledge, your statement on page 6 that the contamination in wells 272 and 277 was due to contaminated sampling vials is incorrect. Contaminants were detected in each well on four and five occasions, respectively; a conclusion that contaminated vials caused the contamination is highly improbable, and has never been documented.

We can find no record of well 225 being sampled in August 1982, as stated in KDHE response number 12.

In summary Item 3 and on page 3, statements are made that the present drainage trenches will prevent the spread of contaminants to the south and west. In fact, these trenches will intercept the contaminants only if the groundwater flows northerly as the proposed groundwater model prepared by Woodward-Clyde indicated. If contaminated groundwater should ever flow to the south or west, the trenches would do nothing to intercept it.

The report should also note that the drainage trenches affect only the contaminants in the A water level, and do not intercept those in the B level.

Please call if you have any further questions. We would also appreciate receiving a copy of the computerized groundwater data you mentioned during your visit.

Sincerely yours,

Robert L. Morby

Robert L. Morby
Chief, Waste Management Branch
Air and Waste Management Division

cc: Ms. Barbara Sabol, Secretary
Kansas Department of Health and Environment
Mrs. Sharilyn Dienst

Mr. GLICKMAN. Thank you. If that's possible, we'll take that for the record, and why don't you give it to the staff here. It probably ought to be a part of the record.

Mr. Everhart, why don't you go ahead. It's a pleasure to have you.

Mr. EVERHART. My name is Michael J. Everhart. I have been the environmental health director for the Wichita-Sedgwick County Department of Community Health since February of 1981, and supervised the department's air quality control and environmental management programs prior to that date.

I was first involved in what was then called the Kansas Industrial Environmental Services waste disposal site in late 1976 during the final stages of the review of the operational permit for that facility.

Our local health staff and that of the Kansas State Department of Health and Environment were aware of the growing need for the environmentally safe disposal of certain industrial wastes and believed that the proposed disposal facility would provide an answer to that need.

At that time the concept of a secure disposal facility was innovative and a major advance over the traditional industrial waste handling practices in the region.

The facility was opened in February 1977, largely on the basis of soil tests which showed the underlying clays to be extremely impermeable to the passage of water.

This conclusion was drawn from the results of seven test holes bored on the original 80-acre site by a consulting firm hired by KIES.

In a letter from Standard Testing & Engineering Co. to KIES dated May 22, 1976, Mr. Lee Deets wrote that:

> It is our belief that the soils and subsurface conditions are suitable for the founding of a facility as proposed, and I emphasize here, providing that the conditions throughout the site do not differ drastically from those encountered in our test borings.

Mr. Deets' prophetic disclaimer actually set the stage for the leakage of chemicals which probably began immediately after opening the site.

Unknown or not considered by the parties involved at the time, including myself, were two critical facts which have since become painfully apparent.

The first was that the geology of the site was not uniform as assumed from the limited number of test borings that were conducted and that there were severe geological problems which would defeat the attempts to dispose of wastes in a secure manner.

The second was that clays which are nearly impermeable to the passage of water will not necessarily contain chemicals such as acids or organic solvents.

In fact, strong acids will and did attack the clay soils under the site and dissolved some materials away, increasing the porosity of the soil.

Based on the assuption that these clays would contain chemicals as well as water, protection of that ground water was largely ignored in the design of the disposal trenches and ponds, even though the initial test borings indicated limited ground water under the site.

There were also unheeded indications from the neighbors of the site concerning a water well on the site and wells on the adjacent 80 acres to the south of the proposed expansion site.

The site was operated without major incidents for the next 3 years. Some complaints were received from area residents, generally concerned with chemical odors from the site, and some operational changes were made at the facility to minimize odors from the neutralization and disposal of wastes.

During that time, inspectors from KDGE in Topeka visited the facility periodically and water samples were taken from the monitoring wells scattered around the property.

In early 1980 the KDHE staffed its Wichita office with a full-time hazardous waste inspector to conduct weekly inspections of the KIES facility and other waste generators. She was able to spend more time at the site on a more or less regular basis and the quality of inspections improved considerably.

These inspections revealed a number of operational problems which the company was duly notified of and required to correct. Generall, however, operations were considered to be satisfactory.

The KDHE inspector resigned her position in July 1980, and I was designated to continue the inspections on a temporary basis until a new state inspector could be hired and trained.

I served in that capacity from July 1980 until January 1981, and then trained the person who as inspecting the site until closure.

During that period I was satisfied that the KIES site was, with few minor problems, being operated according to the specifications of their state permit.

During this period, however, the volume of materials received at the site apparently exceeded all expectations, including the developer's proposed 50-year site life span, and an application was submitted to KDHE on April 17, 1980, for expansion of the facility to the adjoining 80 acres to the south.

Studies done by Haliburton Associates in 1979 showed that:

> The soil and ground water conditions at the new site are technically suitable for use in controlled industrial waste treatment and disposal facility construction, and the proper design of such a facility is within the current state of civil-geotechnical engineering practices.

The Haliburton study also reported that there was only one water well on the new site and that it was dry at the time of the study. Subsequent investigation by the KDHE staff and myself found three wells on the new site, all of which held water, and indications of a fourth well were found immediately adjacent to the property line to the north.

As the result of comments made at the public hearing on the expansion site which was held on July 15, 1980, the State attorney general visited the site in August and the approval of the expansion site was put on hold pending the results of his inquiry.

At the request of neighborhood residents—excuse me just a minute—samples were taken from area water wells and tested for bacterial and chemical contamination. The results of these tests showed no indication of any chemicals related to the waste disposal site.

Inspections by EPA of the KIES facility during the same period did, however, show some indications that leakage was beginning to occur on site.

The first contaminated samples were explained away as poor sampling techniques or residual chemicals in the plastic water lines, and everyone was willing to believe that that was the reason for the unusual test results.

In September 1980 the attorney general issued his opinion that the permit for the expansion site could not be granted by KDHE until additional information was submitted by the company.

At this point, the Kansas Geological Survey was requested to study the site and verify, if possible, the findings of the Haliburton study. Their report, issued in May 1981, indicated that there were two usable aquifers under the expansion site, the uppermost of which was within 10 feet of the disposal trench bottoms and that the permeability of some of the soils was greater than had been first indicated.

The report also identified a large number of wells in the area and, more importantly, verified that there were springs feeding a creek less than a mile to the north of the site.

These springs had been noted in the area in the KGS bulletin 176 published in 1975, and were common knowledge to the local residents, but were not considered in the planning of the facility.

As a direct result of the KGS report, the staff of the Wichita-Sedgwick County Department of Community Health conducted a survey in June 1981 of the Prairie Creek drainage basin to verify the location of the springs and to determine, if possible, the recharge areas for those springs.

We found, in addition to the springs identified by the Kansas Geological Survey, an additional spring later designated as Spring 6. This spring was tested in October 1981 as part of a KDHE-EPA study of wells around the site and was found to be contaminated with a variety of organic solvents known to be disposed of in the KIES facility.

Subsequent testing confirmed that contamination and, on the basis of additional studies done by KDHE, the site was closed on January 18, 1982.

Since closure, detailed studies of the site have shown the contamination to be widespread, and I believe that all disposal areas at the facility are involved to some degree.

Substantial work has been done to put additional cover over the old disposal areas to minimize the infiltration of rain water and two extensive intercept trench systems have been constructed to prevent the flow of contaminated water in the upper aquifer offsite to the north. These trenches have recovered large quantities of ground water from the upper or A zone aquifer and have undoubtedly prevented that water from leaving the site. Whether or not there is still contaminated water leaving the site via the A zone is unknown at this time, however, because there is no means of checking the efficiency of these intercept trenches.

The final stage of the cleanup remains to be completed as of this date and includes two areas, the evaporation ponds and treatment ponds, which are probably significant sources of contaminated water leakage.

The key to the cleanup of these areas has been the construction of a 2½-acre disposal pit or cell lined with a plastic liner.

Designed to accept the contaminated sludges from the treatment ponds and evaporation ponds, this cell was excavated and lined in late 1982. Completion was delayed with the onset of cold weather and an abnormally wet spring.

Maintenance of the cell and liner due to leakage of water under the liner and accumulation of rainwater has been an ongoing problem, and hot summer weather has caused the continual expansion and contraction of the liner.

The length of time that the liner has now been exposed to sunlight also poses the question of possible degradation and weakening of the liner material.

Although I am in agreement that this portion of the cleanup process should be completed as soon as possible, I am concerned that there is apparently no method of assuring long-term integrity of this liner or differentiating between possible future leakage from this lined cell and the existing contamination which is already in the ground water under the cell.

Most of this concern is based on the company's proposal to use the same technology for disposal of new waste material if and when the site is reopened.

It is becoming increasingly apparent that landfills will eventually leak. There are no liners which are absolutely guaranteed not to leak and, given enough time, 20, 30, 50 years, it is likely that even the best container system will fail.

When this happens, we already know that the soils under the site will not hold the wastes and these wastes will eventually spread into the underlying aquifers.

The current hazardous waste regulations only require monitoring of the site for 30 years after closure. After that point, leakage could occur undetected for years and pose an unseen and unknown health and environmental hazard to the community.

Contamination of the ground water under this hazardous waste site is a documented fact. Contamination has left the boundaries of the site and is now reentering the surface environment in small quantities in a nearby creek.

It is likely that these wastes will remain in the area's aquifer in the foreseeable future with no reasonable hope of total cleanup.

Even with the application of the best available containment methods, future safe disposal at the site could not be assured and, worse, any leakage from future disposal could not be differentiated with any certainty from the background level of wastes already contaminating the ground water.

In conclusion, I would say that the NIES waste disposal site was not adequately studied prior to opening, that it was not adequately engineered to receive hazardous wastes, that it was not adequately monitored to detect leakage, and that no refinement of landfill technology will be adequate to assure that future leakage will not occur.

I am opposed to the reopening of the facility and would encourage the development of alternative methods for the safe and environmentally secure disposal of hazardous waste.

I appreciate this opportunity to testify before this committee on this important environmental issue and would be pleased to try to answer any questions you may have.

Thank you.

[The prepared statement of Mr. Everhart follows:]

TESTIMONY BY MICHAEL J. EVERHART

Testimony Given to the Committee on Science and Technology
U.S. House of Representatives
July 30, 1983

My name is Michael J. Everhart. I have been the Environmental Health Director for the Wichita-Sedgwick County Department of Community Health since February of 1981 and supervised the Department's Air Quality Control and Environmental Management Programs prior to that date. I was first involved in what was then called the "Kansas Industrial Environmental Services" waste disposal site in late 1976 during the final stages of the review of the operational permit for that facility. Our local health staff and that of the Kansas Department of Health and Environment were aware of the growing need for the environmentally safe disposal of certain industrial wastes and believed that the proposed disposal facility would provide an answer to that need. At that time, the concept of a secure disposal facility was innovative and a major advance over the traditional industrial waste handling practices in the region.

The facility was opened for business in February of 1977, largely on the basis of soil tests which showed the underlying clays to be extremely impermeable to the passage of water. This conclusion was drawn from the results of seven test holes bored on the original eighty-acre site by a consulting firm hired by KIES. In a letter from Standard Testing and Engineering Company to KIES dated May 22, 1976, Mr. Lee Deets wrote that, "It is our belief that the soils and subsurface conditions are suitable for founding a facility as proposed, providing that the conditions throughout the site do not differ drastically from those encountered in our test borings." Mr. Deets' prophetic disclaimer actually set the stage for the leakage of chemicals which probably began immediately after the opening of the site.

Unknown or not considered by the parties involved at the time, including myself, were two critical facts which have since become painfully apparent. The first was that the geology of the site was not uniform as assumed from the limited number of test borings that were conducted and that there were severe geological problems which would defeat the attempts to dispose of wastes in a secure manner. The second was that clays which are nearly impermeable to the passage of water will not necessarily contain chemicals such as acids or organic solvents. In fact, strong acids will and did attack the clay soils under the site and dissolved some materials away, increasing the porosity of the soil. Based on the assumption that these clays would contain chemicals as well as water, protection of that groundwater was largely ignored in the design of the disposal trenches and ponds, even though the initial test borings indicated limited groundwater under the site. There were also unheeded indications from the neighbors of the site concerning a a water well on the site and wells on the adjacent 80 acres to the south.

The site was operated without major incidents for the next three years. Some complaints were received from area residents, generally concerned with chemical odors from the site and some operational changes were made at the facility to minimize odors from the neutralization and disposal of wastes. During that time, inspectors from KDHE in Topeka visited the facility periodically and water samples were taken from the monitoring wells scattered around the property.

In early 1980, the KDHE staffed its Wichita office with a full-time hazardous wastes inspector to conduct weekly inspections of the KIES facility and other area waste generators. She was able to spend more time at the site on a more or less regular basis and the quality of inspections improved considerably. These inspections revealed a number of operational problems which the company was duly notified of and required to correct. Generally, however, operations were considered to be satisfactory.

The KDHE inspector resigned her position in July, 1980, and I was designated to continue the inspections on a temporary basis until a new State inspector could be hired and trained. I served in that capacity from July, 1980, until January, 1981, and then trained the person who was inspecting the site until closure. During that period, I was satisfied that the KIES site was, with few minor problems, being operated according to the specifications of their State permit.

During this period, however, the volume of materials received at the site apparently exceeded all expectations, including the developer's proposed 50-year site life span; and an application was submitted to KDHE on April 17, 1980, for expansion of the facility to the adjoining 80 acres to the south. Studies done by Haliburton Associates in 1979 showed that "The soil and groundwater conditions at the (new) site are technically suitable for use in controlled industrial waste treatment and disposal facility construction, and the proper design of such a facility is within the current state of civil-geotechnical engineering practice." The Haliburton study also reported that there was only one water well on the new site and that it had been dry at the time of the study. Subsequent investigation by KDHE staff and myself found three wells on the site, all of which held water; and indications of a fourth well were found immediately adjacent to the property line to the north.

As the result of comments made at the public hearing on the expansion site which was held on July 15, 1980, the State Attorney General visited the site in August and the approval of the expansion site was put on hold pending the results of his inquiry. At the request of neighborhood residents, water samples were taken from area wells and tested for bacterial and chemical contamination. The results of these tests showed no indication of any chemicals related to the waste disposal site. Inspections by EPA of the KIES facility during the same period did, however, show some indications that leakage was beginning to occur on site. These first contaminated samples were explained away as poor sampling techniques or residual chemicals in the plastic water lines and everyone was willing to believe that that was the reason for the unusual test results. In September, 1980, the Attorney General issued his opinion that the permit for the expansion site could not be granted by KDHE until additional information was submitted by the company. At this point, the Kansas Geological Survey was requested to study the site and verify, if possible, the findings of the Haliburton study. Their report, issued in May of 1981, indicated that there were two usable aquifers under the expansion site, the uppermost of which was within 10 feet of the disposal trench bottoms and that the permeability of some of the soils was greater than had been first indicated. The report also identified a large number of wells in the area and, more importantly, verified that there were springs feeding a creek less than a mile to the north of the site. These springs had been noted in the area in the KGS Bulletin #176, published in 1965, and were common knowledge to the local residents but were not considered in the planning of the facility.

As a direct result of the KGS report, the staff of the Wichita-Sedgwick County Department of Community Health conducted a survey in June, 1981, of the Prairie Creek drainage basin to verify the location of the springs and to determine, if possible, the recharge areas for those springs. We found, in addition to the springs identified by KGS, an additional spring later designated as Spring #6. This spring was tested in October, 1981, as part of a KDHE-EPA study of wells around the site and was found to be contaminated with a variety of organic solvents known to be disposed of at the KIES facility. Subsequent testing confirmed the contamination and, on the basis of additional studies done by KDHE, the site was closed on January 18, 1982.

Since closure, detailed studies of the site have shown the contamination to be widespread; and I believe that all disposal areas at the facility are involved to some degree. Substantial work has been done to put additional cover on the old disposal areas to minimize the infiltration of rainwater and two extensive intercept trench systems have been constructed to prevent the flow of contaminated water in the upper aquifer off-site to the north. These trenches have recovered large quantities of groundwater from the upper or "A" zone aquifer and have, undoubtedly, prevented that water from leaving the site. Whether or not there is still contaminated water leaving the site via the "A" zone is unknown at this time.

The final stage of the cleanup remains to be completed as of this date and includes two areas, the evaporation ponds and treatment ponds, which are probably significant sources of contaminated water leakage. The key to the cleanup of these areas has been the construction of a 2 1/2 acre disposal pit or cell lined with a plastic liner. Designed to accept the contaminated sludges from the treatment ponds and evaporation ponds, this cell was excavated and lined in late 1982. Completion was delayed with the onset of cold weather and an abnormally wet spring. Maintenance of the cell and liner due to leakage of water under the liner and accumulation of rainwater has been an ongoing problem, and hot summer weather has caused the continual expansion and contraction of the liner. The length of time that the liner has now been exposed to sunlight also poses the question of possible degradation and weakening of the liner material. Although I am in agreement that this portion of the cleanup process should be completed as soon as possible, I am concerned that there is apparently no method of assuring the long-term integrity of this liner or differentiating between possible future leakage from this lined cell and the existing contamination which is already in the groundwater under the cell. Most of this concern is based on the company's proposal to use the same technology for disposal of new waste material if and when the site is reopened.

It is becoming increasingly apparent that landfills will eventually leak. There are no liners which are absolutely guaranteed not to leak and given enough time, 20, 30, 50 years, it is likely that even the best container systems will fail. When this happens, we already know that the soils under the site will not hold the wastes and these wastes will eventually spread into the underlying aquifers. The current hazardous waste regulations only require monitoring of the site for thirty years after closure. After that point, leakage could occur, undetected for years, and pose an unseen and unknown health and environmental hazard to the community.

Contamination of the groundwater under this hazardous waste site is a documented fact. Contamination has left the boundaries of the site and is now re-entering the surface environment in small quantities in a nearby creek. It is likely that these wastes will remain in the area's aquifer for the forseeable future with no reasonable hope of total cleanup. Even with the application of the best available containment methods, future safe disposal at the site could not be assured and, worse, any leakage from future disposal could not be differentiated with any certainty from the background levels of wastes already contaminating the groundwater.

In conclusion, I would say that the NIES waste disposal site was not adequately studied prior to opening, that it was not adequately engineered to receive hazardous wastes, that it was not adequately monitored to detect leakage and that no refinement of landfill technology will be adequate to assure that future leakage will not occur. I am opposed to the reopening of the facility and would encourage the development of alternative methods for the safe and environmentally secure disposal of hazardous waste.

I appreciate this opportunity to testify before this committee on this important environmental issue and would be pleased to try to answer any questions you may have. Thank you.

Mr. **Glickman**. Thank both of the witnesses for excellent testimony.

Mr. Everhart, your last statement is a very dramatic and direct contradiction to what was just stated by Waste Management, Inc.

You state that the disposal site was not adequately studied, that it was not adequately engineered, that it was not adequately monitored to detect leakage, and that no refinement of landfill technology will be adequate to assure that future leakage will not occur.

And then you state in there that you are opposed to the reopening of the facility and you encourage alternatives.

Do you agree with my statement that that particular conclusion is in fact a direct contradiction to the views of Waste Management, Inc.?

Mr. **Everhart**. I would say a contradiction; yes, sir.

What I'm referring to in the initial design of that project has no bearing on what Chemical Waste Management is doing now, but the fact, or the fact is becoming very apparent now that anything disposed of in a landfill is going to migrate from that landfill eventually.

Mr. **Glickman**. I yield to my colleague.

Mr. **Scheuer**. The prior witness in effect said any problem that we might have had was because we designed things without knowledge, but now our knowledge had taken a quantum jump and now we can handle all these things.

What you are saying is that with all the knowledge that we have now applied to this site, and operating at the state of the art, so to speak, there is no way that site can be reopened and operated without being environmental danger or without leaking, applying all the technology and all the state-of-the-art knowledge that we have.

Isn't that what you are saying?

Mr. **Everhart**. Yes, sir.

Mr. **Scheuer**. And what he is saying is, there should be no problem in reopening it because with the increased knowledge that we have had, we have all these new techniques and new processes by which we can clean it up, we can purify it, we can try it out, we can whet it up, we do all these things.

We list a whole bunch of them and, therefore, it's benign. And what you are saying is, "It ain't so."

Mr. **Everhart**. That's correct.

Mr. **Scheuer**. And there is no application of even the current state of the art that's going to enable the site to operate without being environmentally degrading and a threat to human health?

Mr. **Everhart**. Yes, sir. It's my opinion that the site itself, the geology of the site is such that it can never be guaranteed to be secure.

I understand what the company is saying about what they plan to do in the future, the liner, the neutralization of wastes, but there is simply no way of guaranteeing that down the line, and we are looking into the future, and I, you know, a synthetic lined landfill, and technology has been on a day-to-day basis, it hasn't looked 50 years ahead and we are going to deal with those things sometime.

Mr. **Scheuer**. Could the site ever have been designed to prevent contamination and leakage?

Mr. **Everhart**. I think the site could have been designed to defer that contamination. I think the fact that there are aquifers under the site and that these aquifers appear in the environment and springs immediately to the north of the site, leave you with a reasonable doubt that sometime something won't come out in those springs.

Mr. **Glickman**. Now, are you aware of geological work that was ever done in the seventies, at the time this site was initially designed, that would have gone into the issues you just talked about today, the geology with the site?

Mr. **Everhart**. I'm aware of the studies that were done by Standard Testing and Haliburton & Associates on this particular site.

Mr. **Glickman**. Were they independent studies?

Mr. **Everhart**. As near as I can tell, they were independent studies and they were limited studies, because at that time we did not recognize, I guess, what we were getting into.

Mr. **Glickman**. Tell me exactly what the geological studies are.

Mr. **Everhart**. I'm not a geologist so I can't speak to specifically technical details. There are two aquifers under the site that contains water that are used by area residents for stock, and before installation of a rural water district out there, were used as a water supply.

There are signs of carbon materials imbedded in the clay that are extremely permeable to the flow of water, and are actually the basis for the recharge systems for the springs that flow into Prairie Creek year round, even though the 70 or 90, or whatever you want, foot of clay is in existence out there, the ground water does get down to those aquifers and it does appear at the surface immediately to the north of the site.

Mr. **Glickman**. Now, it's been stated that the water table at the Furley site is within 45 feet of the surface, yet one of the evaporation ponds is 45 feet deep. Do you have any independent knowledge of that, and the relation of the fact that any leakage would result in immediate ground water contamination?

Mr. **Everhart**. I have seen that information as provided by the company. There is no indication immediately under that pond where that water table is; it's close. And I would guess that within 5 to 10 feet or less is a reasonable estimate of the separation between those two, and it's that lack of separation and the permeability of those aquifers under those areas that raise some concerns.

Mr. **Glickman**. And the final question, Mr. Everhart, do you have any personal knowledge that there is any dioxin contamination at the site?

Mr. **Everhart**. The lists that I've seen of materials which were disposed of at the site indicate materials such as 2,4,5-T wastes, which are known and at least suspected to contain some dioxins.

Mr. **Glickman**. And so you know if there has been any testing, either by the county or by any of the other governmental units which has tested for dioxin at the site?

Mr. **Everhart**. We don't have the capability of doing that testing. I understand that there has been testing by the State or the EPA, and that those initial tests have not shown any dioxin contamination in the water.

Mr. **GLICKMAN**. Mrs. Dienst, first of all—first of all, I want to compliment you. This is something you didn't read in your statement that I think it ought to be there.

You said:

> We don't know who or what to believe any more, and we are angry. We have had to become overnight students of chemistry, geology, hydrology, government, law and politics just to protect ourselves. It's been a very expensive and time-consuming ordeal.

And we'd like to compliment you on working the system as it has to be worked in order to protect your rights, because if it weren't for people like yourself, whether you have all the facts or part of the facts, and knowing that you are not scientists, you have reached out to try to get as many facts as you can.

If it weren't for citizens' participation, I doubt this problem would be at this stage, not only here in Kansas, but throughout the country. I think it's very, very important that you have pursued the matter, perhaps too diligently for some people, but I think you have pursued it to the benefit of those of us who have to make public policy. I think it's great that you have done it.

I would also say that you have requested that EPA immediately order a complete ground water evaluation for all parameters of waste that have been disposed of at the site, and I'll ask the EPA what, in fact, they have done in this regard, as well as Ms. Sabol when she comes up here.

But if, in fact, I'm not satisfied that they are, in fact, in the process of doing that, Mr. Scheuer and I will write the EPA and demand that that kind of study take place.

So we'll have to get a feel from them, but I appreciate the fact that you have made that request and I think it's an appropriate request.

Mr. Scheuer, do you have any comments?

Mr. **SCHEUER**. Well, I do. I want to thank both of the witnesses. Mr. Everhart was a splendid witness, and I had some questions and Congressman Glickman answered—posed all of them to you.

I just want to tell you from the perspective of somebody from out of town, Mrs. Dienst, that this community is lucky to have a Dan Glickman as its Congressman, and Congressman Dan is lucky to have a citizen like you to work out in the precincts aiding and abetting his efforts, sometimes supporting him and sometimes perhaps goading him into attention where something had escaped his attention.

Congressmen are pulled and stretched from all points of the compass. We can do almost anything pretty well, but we can't do everything and, necessarily, we have to establish some priorities and sometimes there may be some important problems in the district that have escaped our attention, and it takes really intelligent, aroused, concerned, active individuals like you to tug at our elbow and get us to think about a problem we haven't thought about. And once we do, you frequently have organized the material and organized the community in such a way that our efforts are really turned on and galvanized, and you serve a terrifically important public service that appears nowhere in the Constitution or in our Government books, but is, nevertheless, an indispensable part of our Government.

So I want to congratulate you and we ought to have some kind of oak leaf cluster with a Purple Heart. And we don't have that.

The best I can do, and admittedly it's not much of a consolation prize, but Congressman Glickman and I do want to welcome you into a very elite group called the self-styled experts club.

Ms. **Dienst**. Thank you.

May I make one statement? I'm not quite as nervous as I was; I believe I'll talk now.

I just wanted to thank you gentlemen, really thank you for having this hearing, for bringing this out, and I also want to accept the thank you that you have given me, on behalf of the whole bunch of these people out here that have been doing just as much as I have; they just haven't been as loud as I have.

Mr. **Glickman**. Thank you. We appreciate both of you coming here and testifying.

Our third panel today is Ms. Barbara Sabol, director of the Kansas Department of Health and Environment. And, Barbara, you are accompanied by several people with the department, and why don't you go on up there? Why don't you go ahead and give your statement?

Bring your people with you now and then when you are finished I want you to stay up here and then we'll ask Bob Eye, with the Kansas attorney general, to come up, and then after you we'll ask Mr. Morby with the EPA to come up.

STATEMENTS OF BARBARA SABOL, SECRETARY, HEALTH AND ENVIRONMENT FOR THE STATE OF KANSAS; ROBERT VINSON EYE, ASSISTANT ATTORNEY GENERAL, WICHITA, KANS.; AND ROBERT L. MORBY, CHIEF, WASTE MANAGEMENT BRANCH, REGION VII, ENVIRONMENTAL PROTECTION AGENCY

Ms. **Sabol**. They say you can always tell a bureaucrat by the one who has the most books and papers, and I'm the one with the most books and papers.

I am secretary of the Health and Environment for the State of Kansas.

My agency, the department of health and environment, has the very broad responsibilities which its name implies for protecting both the public health and the environment for all Kansans.

Gov. John Carlin said in his message before the legislature in 1983:

> Kansans have a deep respect for the natural resources of our state. They expect a healthy and safe environment composed of clean air, productive land and quality water. They recognize that these natural resources contribute to the productiveness which is of a distinctive quality in Kansas. Preserving and protecting our natural resources must be an effort joined by individuals as well as public and private agencies. As our environment becomes more complex, so must the intensity with which we care for that environment.

Consistent with the Governor's philosophy and direction, it is our department's policy to regulate with a cooperative approach, however maintaining a perspective of healthy skepticism and retention of our independence to allow for vigorous enforcement.

In the areas of hazardous waste management, the long-range effects are such that there is little margin for error in decisionmaking; consequently, with regard to environmental issues, if we err we need to err on the side of maximum protection of the public and environment.

We administer the hazardous waste aspects of RCRA, along with its many and complex supporting regulations, in concert with the U.S. Environmental Protection Agency.

Kansas is an interim authorization State for RCRA administration, and with the cooperation of the Kansas Legislature, it is our intention to obtain final RCRA authorization in 1984.

I think it's important for you to know that in addition to Federal requirements, we carry out some specific Kansas waste mandates which are more stringent than the RCRA requirements. The Kansas differences are:

The small generator exemption in Kansas is set at less than 100 kilograms per month rather than the Federal limit of 1,000 kilograms per month.

A waste not considered to be within the hazardous classification by EPA may be declared a hazardous waste if it is presenting or threatens to present health or environmental problems in Kansas; but its adequate management can be assured under hazardous waste regulations.

Kansas has a review procedure for each individual waste source which requires specific approval prior to disposal. This procedure was the basis for Kansas effectively banning the burial of liquid solvents and pesticides some 16 months prior to similar Federal action.

And finally, Kansas is able to ban the land burial of any hazardous waste for which a more environmentally desirable management alternative is viable. Our recently completed consultant's study on pigment wastes, paint sludges, and printing ink sludges, was our first important action in that regard.

Based on the preliminary review of that report, it is my intent to adopt these recommendations to restrict pigment-waste burial. Therefore, if commercial burial of hazardous waste is resumed in Kansas, disposers will not be able to accommodate pigment wastes without extensive justification as to why burial is necessary.

State and Federal laws and regulations pertaining to solid and hazardous wastes have evolved during the past 17 years. Laws specifying hazardous waste and describing details for their management did not exist in Kansas prior to 1977. You have previously heard the background of NIES and the activities that have been completed to date regarding cleanup of the site and I will not repeat that, though it can be found in my written testimony, in case you were getting a little nervous that I was going to read all of this.

I would like to tell you, though, that the Furley site has been an area to which I've given my priority; it will continue to be high priority until the cleanup plan is satisfactorily implemented. I have made a concerted effort to solicit comments, concerns, and recommendations from a number of interested individuals. The goal of this exchange is to insure that to the degree possible options, ideas, and issues, including those that may be different than those of the department, are discussed and evaluated.

In addition, the department has furnished and continues to furnish the laboratory data and other departmental information to a variety of interested persons.

Let me tell you now where we are with the cleanup activities.

There are certain activities which are yet to be finalized, and these include completion of a disposal cell which is to receive the solidified sludges and contaminated soil from the evaporation ponds and treatment pond. The treatment ponds and the evaporation ponds will have to be closed.

To begin to effect this phase of the cleanup, on July 27, 1983, I instructed the NIES officials as follows:

> With regard to the decommissioning of the T-ponds area, I authorized the use of the new disposal cell for the receipt of contaminated sludge and soil from that area with the condition that if our independent review of compatibility indicates problems, or the absence of sufficient demonstration of the liner suitability, you agree to remove the deposit of contaminated sludge and soil from the disposal cell and dispose of that waste in another manner approved by KDH&E.
>
> The use of the disposal cell and the decommissioning of the T-ponds should be according to the plans submitted for that purpose and those portions approved by the department.

And, as well, during this same period we have a consultant to the Kansas Department of Health and Environment who is reviewing and working with us in designing future cleanup activities.

I also stated to the NIES officials that I believe it to be in the best interests of the State that the evaporation ponds be dewatered as soon as possible.

I stated that their proposal for removal by use of evaporation is not an acceptable method because of the 4- to 6-year period required.

> While I agree with your consultants that the E-ponds are not the major source of the contamination and water within the A Zone, the non-contribution of the E-ponds to the A Zone problem has not been fully demonstrated.

I instructed the officials that it is important that they "promptly devise a plan for removing the E-pond water so that the contaminated sludge may be solidified and disposed of." It is important that any potential contributor to the A zone be eliminated.

I further gave instructions regarding a closure plan, and the fact that that plan should be submitted to me by August 12, 1983, and that the plan must include a schedule for completion and any intervening activities.

It is important to note, and you did have testimony from the officials of the company, that the material from the treatment ponds and evaporation ponds will have to be pH adjusted, will have to be solidified and removed to the disposal cell under the conditions previously described.

The evaporation ponds, in addition, need to be emptied and decommissioned in a similar manner as the treatment ponds.

In addition to these activities, there is extensive ground and surface water monitoring program underway as follows, in a letter that follows, the letter I previosuly described from staff. It included instructions for conducting ground and surface water monitoring, and some of the components were as follows:

All offsite A and B monitoring wells and six surface water monitoring points in the north and south dewatering trenches will be sampled with analyses for pH, conductivity and volatile organic compounds on a monthly basis beginning August 1983.

All onsite A, B, and C monitoring wells are to be sampled with analyses for pH, conductivity, and volatile organic compounds on a quarterly basis.

The monthly sampling is to be coordinated with the quarterly sampling, and all similar wells are to be monitored over a 2- to 4-day period.

Ground water elevations are to be determined for all monitoring wells at the time of the quarterly sampling. there are currently 59 wells monitored, 35 A and 24 B.

We have communicated to the NIES officials that at least nine new wells should be constructed. Five of these are A wells and four are B wells.

In addition, I'm considering the placement of additional wells south of the existing facility. All wells will be monitored for 11 inorganics and metals, 11 pesticides, and 52 organic compounds.

The data generated by these monitoring activities and monitoring activities in the past are regularly reviewed by the departmental multidisciplinary group which are responsible for conducting an ongoing review of information and reports on the site, and for discussing and developing options for the continuation of cleanup.

EPA is participating with the department in this review and analyses to enhance the work of this group. The department has computerized the laboratory data and initiated a statistical analysis.

The immediate goal is to continue to move forward with efficient and effective cleanup and at the same time continue to insure rigorous review of laboratory data and other information so that if modifications in cleanup strategies are needed they can be made expeditiously.

The department will continue to give the NIES project priority status with the ultimate goal of effective protection of health and environment.

A natural question to ask is, What have we learned from this situation?

A simplistic answer is, and you have heard it before today, the simplistic answer is that we not approve today a hazardous waste facility based on the original disposal plans for the site.

Yet, under the standards and laws of that time, approval appeared appropriate. There were no Federal and State hazardous waste laws and regulations in 1976, and the KDH&E staff believed that the proposed facility would be secure and would present no significant risk of ground water contamination.

There is keen public and press interest regarding hazardous waste, and at times there have been doubts about the adequacy of KDH&E's regulatory efforts. If there is a malady called overaudit, probably we at KDH&E and the KDH&E staff resources have been used in activities related to audit.

In fact, the agency has undergone five major auditor reviews within the past 3 years with the focus being on its hazardous waste management program.

I perceive that the major findings of the various audits substantiate that the department is satisfactorily following the laws and regulations relevant to the Furley site.

These audits, in addition, have identified opportunities for improvement, some of which have been previously considered and acted on by the department.

An EPA audit has described the hazardous waste management bureau and their activities as near exemplary.

Let's go back to that question of what is it we need to be concerned about in the future, beyond the Furley site. These are not in any kind of priority, but let me just briefly go through them.

It is important that Federal support of RCRA and the Superfund be an ongoing part of the national strategy. It would be unfortuntae if the program were to be carried through the phase of transfer of responsibility to the States, with a subsequent reduction in Federal funding. We would not like to see the block grant scenario happen with the RCRA activities.

In order to achieve our mutual policy objectives and preserve the quality of the environment, an appropriate funding partnership between the Federal Government and the State is necessary. We need a strong continuing Federal commitment, both in dollars and technical assistance. Continuing support for computer hardware and software, laboratory, and other equipment is necessary.

The RCRA regulations should be simplified where possible and one example is the delisting process.

There should be greater input into policy and interpretation of regulations beyond that contemplated in the comment period concerning the proposed Federal regulations.

The Federal Government needs to address some long-term issues, specifically the Federal role in encouraging industry to consider alternatives to land burial of hazardous waste.

The match required by the Superfund law should be reconsidered.

It appears to us that there is no logical justification as to the public/nonpublic site ownership having a distinction ranging from 10 percent to 50 percent for the State match.

A more practical approach would be to revise the industrial tax funding of the Superfund to a slightly higher level and do away with the requirements for State match.

It has been our early experience that definition of the responsible parties, and whether they are public or not public can be confusing and provide grounds for raising legal issues that oftentimes delay solution.

I'd like to use this opportunity to congratulate EPA on its recent Superfund policy interpretation which promotes immediate remedial action in emergency situations. It is critical that the problems be corrected promptly without delay while the determination of responsibility is made.

Siting remains a national concern for hazardous waste plants, and I suggest perhaps one approach, use of the regional compacts, should again be considered.

The long-term effects of trace amounts of toxic chemicals on human health is largely unknown. In Kansas, we are developing a system for collecting and storing and studying the relationship of environmental factors to health. It will be important that such systems for study be established and integrated on a national level to facilitate the acquisition of answers to these important and tantalizing questions.

Until these questions are answered, our role is clearly to minimize exposure through adequate control of these materials.

After all the items that I have mentioned today, the most important is developing incentives for use of alternatives to land burial. I have attached for your information a copy of the Wilson Laboratory consultant report to the department on pigment wastes, paint sludges and printing ink sludges, which provides the basis for a refinement of our own land burial policy in the hazardous waste management program. Only with extensive justification and through exception will we permit land burial of pigment waste. Viable alternatives are available and additional ones must be identified.

We do very much appreciate your interest in improving the management of hazardous wastes. The problems are complex, but they can be solved in ways that minimize risks to health and environment.

Governor Carlin has set the tone for Kansas.

> Preserving and protecting our natural resources must be an effort joined by individuals as well as public and private agencies. As our environment becomes more complex, so must the intensity with which we care for that environment.

Let me use this opportunity to reaffirm the department's major mission as protection of public health and environment of all Kansans, and that we have and will continue to fulfill that mission with a regulatory approach premised on cooperation, but with a perspective of healthy skepticism and retention of our independence to allow vigorous enforcement and, additionally, by investing some of our limited resources in identifying viable alternatives to land burial of hazardous wastes.

I appreciate the opportunity to appear before the committee. And with the assistance of two KDHE staff, Mr. Howard Duncan to my left and Mr. John Paul Detz to my right, we would be happy to respond to any questions you might have.

[The prepared statement of Barbara J. Sabol follows:]

TESTIMONY OF

BARBARA J. SABOL, SECRETARY
KANSAS STATE DEPARTMENT OF HEALTH AND ENVIRONMENT

BEFORE THE

SUBCOMMITTEE ON NATURAL RESOURCES,
AGRICULTURE RESEARCH AND ENVIRONMENT

U.S. HOUSE COMMITTEE ON SCIENCE AND TECHNOLOGY

JULY 30, 1983

Good morning. I am Barbara J. Sabol, Secretary of Health and Environment for the State of Kansas. My Agency, the Kansas Department of Health and Environment, has the very broad responsibilities which its name implies for protecting both the public health and the environment for all Kansans. Governor John Carlin said in his message before the legislature in 1983:

> "Kansans have a deep respect for the natural resources of our State. They expect a healthy and safe environment composed of clean air, productive land and quality water. They recognize that these natural resources contribute to the productiveness which is of a distinctive quality in Kansas. Preserving and protecting our natural resources must be an effort joined by individuals as well as public and private agencies. As our environment becomes more complex, so must the intensity with which we care for that environment."

Consistent with that, it is our Department's policy to regulate with a cooperative approach, maintaining a perspective of healthy skepticism and retention of our independence to allow for vigorous enforcement. In the area of hazardous waste management the long range effects are such that there is little margin for error in decision making, consequently with regard to environmental issues, if we err, we need to err on the side of maximum protection of the public and environment.

The regulatory role of the Department with regard to environment is broad indeed, protecting both the public health and environment. One of our Department's regulatory responsibilities is the oversight of hazardous waste management practices. We administer the hazardous waste aspects of RCRA, the Resource Conservation and Recovery Act, along with its many and complex supporting regulations in concert with the U.S. Environmental Protection Agency (EPA). Kansas is an interim Authorization State for RCRA administration. With the cooperation of the Kansas Legislature, it is our intention to obtain final RCRA authorization in 1984. In addition to the federal requirements, we carry out some specific Kansas hazardous waste mandates which are more stringent. The Kansas differences are:

1. The small generator exemption in Kansas is set at less than 100 kilograms per month rather than the federal limit of 1,000 kilograms per month.

2. A waste not considered to be within the hazardous classification by EPA may be declared a hazardous waste if it is presenting or threatens to present health or environmental problems in Kansas. Thus, its adequate management can be assured under hazardous waste regulations.

3. Kansas has a review procedure for each individual waste source which requires specific approval prior to disposal. This procedure was the basis for Kansas' effectively banning the burial of liquid solvents and pesticides some sixteen months prior to similar federal action.

4. Kansas is able to ban the land burial of any hazardous waste for which a more environmentally desirable management alternative is viable. Our recently completed consultant's study on pigment wastes (paint sludges and printing ink sludges) was our first important action in that regard. Based on the preliminary review of that report, it is my intent to adopt these recommendations to restrict pigment waste burial. Therefore, if commercial burial of hazardous wastes is resumed in Kansas, disposers will not be able to accommodate pigment wastes without extensive justification as to why burial is necessary.

State and federal laws and regulations pertaining to solid and hazardous wastes have evolved during the past seventeen years. Laws specifying hazardous wastes and prescribing details for their management did not exist in Kansas prior to

1977. Yet, what we have come to define as hazardous wastes were in ample existence prior to 1977 and were in need of proper management. The National Industrial Environmental Services (NIES) hazardous waste disposal facility in Northeastern Sedgwick County was designed and constructed in 1976 and early 1977. The Kansas Department of Health and Environment was closely involved with that construction, approving the plans based on the standards available at that time and inspecting the construction as it proceeded.

The facility incorporated 5 basic waste management functions: (1) burial of liquid and solid chemical waste; (2) evaporation of acid and caustic dilute wastes to eventually leave a sludge for later burial; (3) chemical treatment of wastes to make them more suitable for evaporation or burial; (4) short-term storage of solvents and other chemicals which could be reclaimed and recycled when sufficient quantities were accumulated; and (5) secure longer-term storage for PCB's (Polychlorinated biphenyls) while the technology for their destruction was being perfected.

In 1980, the facility owners requested permission to expand the original 80-acre site by adding the immediately adjacent 80 acres to the south. There was extensive review by both this agency and EPA. This request for expansion was not approved by the Secretary and was subsequently withdrawn by the company. Control of the firm changed in late 1980 from the original local developer to Chemical Waste Management, an Illinois-based company which is one of the nation's largest hazardous waste managers. Subsequently, studies at the site yielded information showing unanticipated movement of contaminated groundwater. This contamination was confirmed by the KDHE laboratory analyses completed on the weekend preceding Monday, January 18, 1982. On that date, the Secretary issued an order suspending the disposal and treatment activities at the site. The concern and the basis for the suspension, related to the fact that contaminated groundwater had migrated from the waste site and posed a potential threat to the public health. This suspension continues. NIES has been allowed to continue using the site as a marshalling area or transfer station for hazardous wastes enroute to other states for treatment or disposal.

Since 1981, the site owners have been using Woodward-Clyde Consultants to study the situation and develop remedial actions. For approximately the same period of time, KDHE has been using the consultant firm of CH_2M-Hill to provide an independent appraisal. Both of these firms have national hazardous waste management expertise. KDHE has also utilized the U.S. EPA and the Kansas Geological Survey staff on review committees.

A plan was developed to remedy and contain the contamination to the disposal areas. The plan intended to: 1) stop the migration of contaminated water, to close out the treatment ponds and evaporation ponds, and to remove the materials contained therein. 2) remove the water from the disposal areas, 3) to prevent recharge of the water in the disposal areas and 5) to monitor migration material to assure that containment of contamination has been effected.

The remedial plan to date has included the following accomplishments:

1. Two dewatering trenches have been constructed and are operational. Approximately 300,000 gallons of contaminated water have been pumped from the trenches.

2. The north and south disposal areas have been covered with at least three feet of clay, with the top layer mixed with fly ash, to prevent the shrink/swell process. The cover has been graded to provide surface drainage and grass seeds have been planted.

3. The site has been regraded to provide surface drainage to the pond in the northeast corner.

4. A disposal cell has been constructed for receipt of solids disposal from the decommissioning of the Treatment ponds and Evaporations ponds. The ground and surface waters, both on site and off site, are being monitored to determine contamination movement and to provide early warning which would allow additional intervention if necessary.

The Furley site has been an area to which I have given high priority. It will continue to be a high priority until the cleanup plan is satisfactorily implemented.

I have made a concerted effort to elicit comments, concerns, and recommendations from a number of interested individuals. The goal of this exchange is to ensure that to the degree possible, ideas, options and issues -- including those that may be different than those of the Department, are discussed and evaluated.

In addition, the Department has furnished, and continues to furnish the laboratory data and other departmental information to a variety of interested persons.

Cleanup activities which are yet to be finalized include:

1. Completion of the disposal cell which will receive the solified sludges and contaminated soil from the evaporation ponds and treatment ponds.

2. The treatment ponds will have to be closed.

3. The evaporation ponds will have to be closed.

To effect these, on July 27, 1983, I instructed NIES officials as follows:

> With regard to decommissioning the T-ponds area, I authorize your use of the new disposal cell for the receipt of contaminated sludge and soil from that area with the condition that if our independent review of compatibility indicates problems, or the absence of sufficient demonstration of the liner suitability, you agree to remove the deposit of contaminated sludge and soil from the disposal cell and dispose of that waste in another manner approved by KDHE. The use of the disposal cell and the decommissioning of the T-ponds should be according to the plan submitted for that purpose and those portions approved by the Department.
>
> I believe it to be in the best interest of the State that the evaporation ponds be dewatered as soon as possible. Your proposal for removal by use of evaporation is not acceptable because of the 4 to 6 year period required. While I agree with your consultants that the E-ponds are not the major source of the contamination and water within the A-zone, the non-contribution of the E-ponds to the A-zone problem has not been fully demonstrated. It is important that you promptly devise a plan for removing the E-pond water so that the contaminated sludge may be solidified and disposed of in the new cell. It is important that any potential contributor to the A-zone be eliminated.
>
> A closure plan for the evaporation ponds must be resubmitted. This plan should be submitted by August 12, 1983, and must satisfy all conditions of K.A.R. 28-31-8 and 40 CFR 265.112. In the event an extension is needed, please contact me prior to August 12, 1983. The plan must include the date upon which this decommissioning is to be completed and the schedule for intervening closure activities.

4. The material from the treatment ponds and the evaporation ponds will have its pH adjusted, solidified and removed to the disposal cell. After cleanup of the treatment ponds the excavations need to be filled with clay, capped and sowed to grass.

5. The evaporation ponds need to emptied of water and decommissioned in the same manner as the treatment ponds, except that it is possible that the evaporation pond excavation sites may be redesigned for future disposal of solid hazardous waste.

There is an extensive ground and surface water monitoring program under way as follows:

1. All offsite A and B monitoring wells, 6 surface water monitoring points, and the north and south dewatering trenches will be sampled with analyses for pH, conductivity and volatile organic compounds on a monthly basis beginning August, 1983.

2. All onsite (the existing 80 acres) A, B and C monitoring wells are to be sampled with analyses for pH conductivity and volatile organic compounds on a quarterly basis.

3. The monthly sampling is to be coordinated with the quarterly sampling.

4. All similar wells are to be monitored over a 2 to 4 day period.

5. Groundwater elevations are to be determined for all monitoring wells at the time of the quarterly sampling.

There are 59 wells currently monitored (35A and 24B).

We have already communicated to NIES that 9 new wells should be constructed. Five of these are A wells and 4 are B wells. In addition, we are considering instructing NIES to place additional wells south of the existing facility. All wells will be monitored for 11 inorganics and metals, 11 pesticides, and 52 organic compounds.

The data generated by these monitoring activities are regularly reviewed by a departmental multi-disciplinary group which is responsible for conducting an ongoing review of information and reports on the site and for discussing and developing options for the continuation of the cleanup. EPA is participating with the Department in this staff review and analysis. To enhance the work of this group, the Department has computerized the laboratory data and made it available for statistical evaluation.

The immediate goal is to continue to move forward with efficient and effective cleanup and at the same time continue to ensure rigorous review of the laboratory data and other information, so that if modifications in cleanup strategies are needed they can be made expeditiously.

It is important to remember that the cleanup in large part relates to removing the water from the disposal area and preventing water recharge. In certain circumstances, removal and better containment of wastes is required, for example, the contaminants in the treatment and evaporation ponds.

The role of monitoring is two fold:

1. Regular site and record inspection; and
2. To measure certain groundwater elevations and the concentration of contaminants and other chemical characteristics of the groundwater. Certain surface water points require monitoring as well.

The above are accomplished for both of the upper groundwater strata.

The monitoring lets us know to what extent the dewatering activities are successful and alerts us to additional contributions to the groundwater. Without groundwater in the upper discontinuous zone (A zone), the problem of groundwater contamination is minimized. Water in the A zone can move the waste around the site, move it off-site, and where the A zone connects with the lower groundwater strata (B zone), it can contaminate the groundwater as well. Thus we must focus our attention on removal of water and prevention or recharge of the zone.

There has been great concern over fluctuations of contaminants in the groundwater. It must be remembered that there are many variables contributing to the individual laboratory results. Even if one can minimize variables related to collection, transport and analysis, the chemical found at any one time relate to contamination of the groundwater at a prior time, to the amount of water in the compartment, the rate of flow, and the direction from which the water reaches the well.

Inasmuch as the A zone is discontinuous and largely unknown with regard to specific water movement, changes in concentration have to be interpreted with many factors in mind. In general, trends in groundwater contamination will be more important than any one individual change.

Once we eliminate the groundwater in the A-zone and the recharge of A-zone, the potential for off-site migration becomes appreciably reduced as the "carrier" of the contaminants is no longer present.

The Department will continue to give the NIES project priority status with the ultimate goal of effective protection of the health and the environment. A natural question to ask is, "What have we learned from this situation?" A simplistic answer is that we would not approve today a hazardous waste facility based on the original disposal plans for the site. Yet, under the standards and laws of that time, approval appeared appropriate. There were no federal and state hazardous waste laws and regulations in 1976. KDHE staff believed that the proposed facility would be secure and would present no significant risk of groundwater contamination.

There is groundwater contamination on the site in the immediate vicinity of the inactive disposal cells. Part of the cleanup plan is designed to contain this contamination to the disposal areas. The high level of contamination on site is being contained. There is low level contamination of groundwater which has migrated off site, however, there is no immediate danger to public health or environmental quality. Should changes detected in monitoring indicate a problem, additional measures will be taken.

There is keen public and press interest regarding hazardous waste and at times there have been doubts about the adequacy of KDHE's regulatory efforts. The agency has undergone 5 major audits within the past three years with the focus, its hazardous waste management program. I perceive that the major findings of the various audits substantiate that the Department is satisfactorily following the laws and regulations relevant to the Furley site. These audits, in addition, have identified opportunities for improvement some of which had been previously considered and acted on by the Department. An EPA audit has described the Kansas program as near exemplary.

We have the following future concerns:

1. It is important that federal support of RCRA and CERCLA be an ongoing part of the national strategy. It would be unfortunate if the program were to be carried through the phase of transfer of responsibility to the states, with a subsequent reduction of federal funding.

2. In order to achieve our mutual policy objectives and preserve the quality of the environment, an appropriate funding partnership between the federal and state government is necessary. We need a strong continuing federal commitment both in dollars and technical assistance. Continuing support for computer hardware and software, laboratory and other equipment is necessary.

3. RCRA regulations should be simplified where possible; for example, delisting. There should be greater input into policy and interpretation of regulations beyond that contemplated in the comment period concerning the proposed federal regulations.

4. The federal government needs to address some long term issues, specifically the federal role in encouraging industry to consider alternatives to land burial of hazardous waste.

5. The match required by the Superfund law, CERCLA, should be reconsidered. There is no logical justification as to the public/non-public site ownership having a distinction ranging from 10% to 50% for the state match. A more practical approach would be to revise the industrial tax funding of CERCLA to a slightly higher level and eliminate requirements for state match. It has been our early experience that definition of the responsible parties and the determination of whether they are public or non-public can be confusing and provide grounds for the raising of legal issues that delay solutions. EPA is to be congratulated upon its recent CERCLA policy interpretation which promotes immediate remedial action in emergency situations. It is critical that the problems be corrected promptly, without delay, while the determination of responsibility is being made.

6. Siting remains a major national concern for hazardous waste management. One approach could be the development of model standards which can be molded by states to meet their individual needs.

7. The use of Regional compacts should again be considered.

8. The long term effects of trace amounts of toxic chemicals on human health is largely unknown. In Kansas we are developing a system for collecting, storing and studying the relationships of environmental factors to health. It will be important that such systems for study be established and integrated on a national level to facilitate the acquistion of answers to these important and tantalizing questions. Until these questions are answered our role is clearly to minimize exposure through adequate control of these materials.

Of all the items mentioned today the most important is developing incentives for use of alternatives to land burial. I have attached for your information a copy of the consultants study on pigment wastes (paint sludges and printing ink sludges) which provides the basis for a refinement of the land burial policy of the Kansas hazardous waste management program. Only with extensive justification and through exception will we permit land burial of pigment waste. Viable alternatives are available and additional ones must be identified.

We appreciate your interest in improving the management of hazardous waste. The problems are complex, but they can be solved in ways that minimize risk to health and to the environment.

Governor Carlin has set the tone for Kansas.

> "Preserving and protecting our natural resources must be an effort joined by individuals as well as public and private agencies. As our environment becomes more complex, so must the intensity with which we care for that environment."

I will use this opportunity to reaffirm KDH&E's major mission as protection of public health and environment of all Kansans and that we have and will continue to fulfill that mission with a regulatory approach premised on cooperation with a perspective of healthy skepticism and retention of our independence to allow for vigorous enforcement and by investing some of our limited resources in identifying viable alternatives to land burial of hazardous waste.

I appreciate the opportunity to appear before the subcommittee.

KANSAS DEPARTMENT OF
HEALTH & ENVIRONMENT

ALTERNATIVE HAZARDOUS WASTE PROCESSING AND DISPOSAL REPORT

PAINT AND PRINTING WASTES

Contract No. WL 82-6-14
25 June 1982

JANIS C. BUTLER
8675

RECEIVED
JUL 29 1983

JC Butler, P.E.
RP Selm, P.E.
SE Ascher, P.E.

JULY 1983
(82-9552)

WILSON LABORATORIES
ANALYTICAL & RESEARCH CHEMISTS & BIOLOGISTS

SECTION I - EXECUTIVE SUMMARY

This Report on Paint Sludge Disposal has been prepared by Wilson Laboratories, Salina, Kansas, for the Kansas Department of Health and Environment under contract WL 82-6-14, dated 25 June 1982. This report concerns the technical and economic feasibility for disposal techniques, with particular reference to those procedures which are alternative to disposal in a hazardous waste landfill.

This report specifically addresses the several methods of disposal of paint and printing sludges and residues from industrial and commercial manufacturing operations. Approximately eight percent of the hazardous waste volume buried in Kansas is paint and printing waste. In 1981, 52 industries landfilled 8,500 drums of paint and printing waste, and over 50 percent of the waste which was landfilled was generated in Sedgwick County. These wastes are collected in barrels or disposal containers and have traditionally been collected in combination with waste oils, floor sweepings and miscellaneous plant wastes. Many of the wastes produced from these collection procedures have not and should not exhibit hazardous characteristics. In certain painting operations, however, toxic metals and organic substances may be released from the waste residues if allowed to leach in a landfill operation. Many tons of materials marked for disposal consist of raw materials or other unused components of paints. This report will examine the contents of these residues and define their toxic characteristics.

Collection, segregation, separation, treatment and disposal procedures and flowsheets are presented in the report. Economics of the procedures are discussed and compared to cost of land burial of the raw wastes. Several alternative disposal techniques exist, including recycling or reclaiming of solvents; incineration; and acid-leaching, heavy metal reduction and precipitation.

The goal of these techniques is to produce a non-hazardous residue suitable for disposal in a landfill. Typical costs for alternate technologies are $125 to $930 per ton for incineration and $520 to $750 per ton for complete treatment utilizing acid leaching.

The estimated costs for direct land burial are from $110 to $130 per ton calculated on 1983 prices.

A regulatory strategy for effecting the practical reduction in the disposal of hazardous wastes by landfill burial is presented.

Mr. GLICKMAN. I want to thank you, Barbara, for an excellent statement. I'm aware of the difficulty of your job since you have taken on that task, and have heard nothing but compliments about your dedication in carrying out the intentions of the State as amplified by Governor Carlin in terms of environmental protection, and also your working creatively to try to work out some of the problems that may have existed before regulatory agencies existed by the State and Federal Government, and I think that that is all to the good of the people whose lives it affects. It's not who runs the programs or who is responsible, but keeping junk out of their water supply keeping their environment healthy for themselves and their children.

And I am referring to a Wichita Eagle-Beacon newspaper story this morning on this particular hearing, and your position on this has been that you have not really made up your mind yet on the landfill, that you and the EPA will decide eventually whether to approve an applicant to reopen the site based on all the materials that come in. Is that right?

Ms. SABOL. That's right at this point in time, and I tried to address that in the testimony. The priority is cleanup, and so until cleanup has been implemented satisfactorily, I am not looking at the issue of reopening and, further, we don't have before us at this point an application under the part B requirements.

Mr. GLICKMAN. Well, I would then ask Mr. Duncan, who is Chief of Environment and Sanitation for the department if he has reached a different conclusion. This morning's conclusion, he has been quoted, and I quote, "We have been told by both the company's consultant and our own consultant that the site is far above average," said Duncan, "and who will accompany Secretary Barbara Sabol today at the hearings. It's a good site, even today, from a geological perspective." So I'd ask you, Mr. Duncan, have been made up your mind and just haven't told Secretary Sabol that yet?

Mr. DUNCAN. No; Congressman Glickman, that is, indeed is what I told the reporter. The question was, how sound is the site geologically, and I said a conclusion has not been reached. He said, what are you being told about the site, and I gave him that information which was quoted and attributed to me as a position statement, which indeed it was not.

Mr. GLICKMAN. So what you are saying is you do not—of course the views of the department, I assume, are represented by the Secretary here, but I didn't want to see what I considered to be inconsistent statements coming out of the department, because that will confuse EPA as well as other regulatory officials. You have not made up your mind on reopening the landfill, nor on terms of expanding that landfill?

Mr. DUNCAN. That is correct. I even gave a disclaimer to Michael Ginzberg, whose article I'm sure you are quoting from. I have seen the article. I told him that I was not a geologist and attempted to beg off an answer to that question. He seems to think that his public would want to read it.

Mr. GLICKMAN. I guess my point is, I thought the waste management person who was here presented some good testimony on their behalf, and nobody has alleged to date they have been engaged in any illegal or otherwise negligent conduct, but you can't rely on their consultants to tell you the site is good; they certainly aren't going to tell you the site is bad.

Mr. **Duncan**. The agency has geological experts, it just does not reside within my program.

Mr. **Glickman**. In line with that, we have in our possession, because it was given to us by waste management, it was before you came onboard, Barbara, a letter from a Melville Gray, Deputy Director, Division of Enforcement, to a Barbara Hamilton, staff council, South Carolina Department of Health and Environmental Control, and that letter talks about the South Carolina Government asks their perception of Waste Management, Inc.'s ability and willingness to comply with regulations and law calculated to protect the health and minimize the danger to life, and I quote from the response.

> Working with Waste Management has been a pleasure in that their policy appears to be one of attacking a problem with the best resources available until corrections have been accomplished. There has never been any difficulty in obtaining technically sound action on their part. In many instances they appear to go beyond the call of duty for the benefit of increased safety or for the benefit of public relations.

I'm not exactly sure what that means, and I'm not sure what the role is. I just point out in terms of, now you are dealing with other regulatory agencies. I think it's really important since you are probably even more at the helm than the EPA to present an air of impartiality that occurred before you came onboard. I don't know if you have seen that letter or not, but it's the kind of letter that confuses us and probably will confuse the EPA a little bit, and I wanted to bring that to your attention.

OK. Now, let me ask you some questions about, has the KDHE cooperated with the EPA in testing the Furley site for dioxin?

Ms. **Sabol**. There has been dioxin testing at the site prior to my arrival, and in March of this year I made a request to EPA for additional dioxin testing. That dioxin testing was done and there was no detectable levels of dioxin in the samples that were taken. Since then there has been additional—am I saying this or have we received the dioxin report?

Mr. **Duncan**. We received the earlier reports which were from last year, approximately 30 or 36, I believe, that were negative for dioxin within water. The new samples were taken perhaps a week or 10 days ago and we have no results at this time.

Ms. **Sabol**. So it was the latest round of sampling was at my request in March.

Mr. **Glickman**. I asked before Waste Management a little bit about test well 220. Do you know if test well No. 220 was sampled for dioxin, and if not, why not?

Ms. **Sabol**. I only answer for the latest rounds of samples, because I'm not sure about the samples that were taken previously. well 220 was not tested for dioxin. We went about the process of deciding which wells were to be tested, and for whatever reason I don't know, well 220 did not come up on that list. My verbal staff report is that they were onsite. EPA did suggest or request or whatever that dioxin testing be done on well 220. My verbal staff report indicates that my staff replied that it was not on the list;

however, if EPA so chose, they could certainly make that dioxin testing.

Based on the concern—I might tell you, Congressman Glickman, that based on the concern, we will move forward with an additional request and provide an additional sample from well 220.

Mr. GLICKMAN. The reason why, we have been told, staff has been told that potential dioxin-contaminated chemicals were disposed of near that test site, that well, and so it would just seem to be appropriate that the test be done there, and there seems to be a gap.

Ms. SABOL. We'll nail the gap expeditiously.

Mr. GLICKMAN. And you'll do that I guess in cooperation with the EPA?

Ms. SABOL. That's correct.

Mr. GLICKMAN. When are you going to get the results of your latest test, the dioxin test?

Ms. SABOL. That might better be addressed to the EPA since it's their lab which does the testing.

Mr. GLICKMAN. Let me ask you this. The problems that have existed in the last year or two regarding waste sites generally, there have been a lot of reports in the news media about conflicts between the Federal and State Governments. You know, in Kansas we have seen all sorts of stories about EPA versus your department. All that occurred primarily before you came as Secretary of that department. Do you have any general feelings to what do you attribute institutionally the kind of conflict that seems to exist between State and Federal departments on this particular issue, you know, landfill, waste management enforcement, related issues?

Ms. SABOL. I don't know that I can talk about it generally, but I can talk about it around this particular site perhaps. First of all, let me say that from my perspective since January, our relationship with EPA has been a positive one. When you are talking about a State government dealing with the Federal Government, just on its face there is bound to be some differences and perhaps some conflicts, and I think the issue is, how do you resolve those differences, but as it relates to this particular site, I think we were in a situation that has been described as a "fast-track" situation where the objective was, solve the problem as expeditiously as possible. So as that happened there were opinions and ideas about what approaches ought be be taken, but that it was the State agency that was in the lead. And it seems when EPA made suggestions those were indeed seen as suggestions by the department rather than mandates, and so on a number of those we have gone back, we have looked at them, we have reconsidered. And a number of the recommendations they have made have been implemented.

Mr. GLICKMAN. Yeah. As I said before, I don't think it's useful to point fingers because it's irrelevant. What we are trying to do is to get to an ultimate objective of making a decision about this landfill, together with, I assume that there are other landfills in this State.

Ms. SABOL. There are, sir.

Mr. GLICKMAN. How many?

Mr. DUNCAN. Hazardous landfills, there are no others.

Mr. GLICKMAN. This is the only one with hazardous waste?

Mr. DUNCAN. Common trash sanitary landfills, approximately 130 to 135.

Mr. GLICKMAN. But the hazardous waste, there is just one in the State of Kansas?

Mr. DUNCAN. This is the only one that serves commercial wastes. There are several other land burial situations on the site of the industry that generates.

Mr. GLICKMAN. And you are monitoring those as well?

Mr. DUNCAN. Yes, sir.

Mr. GLICKMAN. But in any event, I guess what I'm trying to figure out from this point on, do you feel that you have an adequate working relationship with both the EPA as well as the county and local officials here to make the necessary decisions and in determining whether to keep the site open or not?

Ms. SABOL. I feel we do, but again I need to point out that our first effort has to be directed toward cleanup, and that working relationship has to be implemented around cleanup first. But I certainly feel that the relationship is such that we can achieve that.

Mr. GLICKMAN. What is being done on cleanup, what kind of technical things are being done?

Ms. SABOL. As it was pointed out, there are several activities that have occurred. The dewatering trenches are in place, the disposal cell is in place, and right now we are doing an independent review of liner compatibility, and as I set out, we have provided certain authorizations with conditions to the company about how they might use——

Mr. GLICKMAN. What liner compatibility?

Ms. SABOL. As has previously been described in the disposal, in the new disposal cell that was designed for the purpose of receiving the sludge from the treatment ponds and E-ponds, there is a flexible membrane liner in there, and so we have to satisfy ourselves that any sludge that is placed in that liner is compatible with that liner, to get away from the kind of problems you were describing when you talked about Dr. Brown's work.

Mr. GLICKMAN. Mr. Scheuer.

Mr. SCHEUER. Can you tell me how long you think it will take before the actions will be completed that will substantially clean up the site and put you in a position to decide whether or not you want to reopen it for further disposal?

Ms. SABOL. I don't know that I can give you a time certain. There are some points on which I think we are all agreed, and one is that the T-ponds are the major problem, and we need to move forward with decommissioning those as expeditiously as possible. There are some investigations that the department must make independently before we'll be able to completely do that, and so I can't give you a time certain, though I can tell you that that's at the top of the priority list, as well as the water in the E-ponds. Dewatering the E-ponds is also a priority. I think we must get that water off the site and we must do that as expeditiously as possible. And I have set those things out in my letter to the NIES officials and they have until August 12 to make a response.

Mr. SCHEUER. I don't wish to imply that I'm in a great hurry for you to finish. It may be that it would take 5 years or 10 years, or

20 years before you completely cleaned up this site. I suspect naturally it's going to be decades before we clean up these toxic dump sites. I'm just wondering at what point in time will you be making the decision as to whether this site should be opened as a site for further disposal.

Ms. SABOL. Point No. 1, I won't be making a decision before we get the part B application, and the firm has until September 10, I believe, to submit that part B application. Second, it would be my hope that we would not take a year or 2 years to implement those activities that I just described, determining the compatibility of the liner and moving forward with utilization of the disposal cell, dewatering the E-ponds, but I think we have to recognize that cleanup probably, complete cleanup will not occur in that 5-year period that you are talking about.

Mr. SCHEUER. Will it occur in 10 years, 15 years, 20?

Ms. SABOL. I don't know.

Mr. SCHEUER. What time frame are you talking about?

Ms. SABOL. In terms of total cleanup, we are talking about forward into the future 20 to 30 years perhaps, or maybe more.

Mr. SCHEUER. Are you saying, then, and I don't want to put words in your mouth, are you saying that no decision will be made on reopening the site for further disposal until this cleanup has been substantially completed, however long it may take?

Ms. SABOL. No; what I'm saying is that I'll not consider reopening of the site until we have satisfactorily implemented a cleanup plan. That is, a plan that fulfills the needs of the department to insure that there is appropriate monitoring, that the wastes have been properly neutralized, that the water is off the site. So I want to be sure that whatever plan we approve for cleanup is satisfactorily implemented, but that does not mean that all the water will be free of volatile organics because that I far into the future.

Mr. GLICKMAN. I want to thank you very much for excellent testimony today, and appreciate the cooperation that you have given to our committee staffs. They have told us that you particularly have been quite cooperative and we are grateful.

Mr. GLICKMAN. I think we have a gentleman from the Attorney General's office representing Attorney General Stephan, Robert Vinson Eye, Assistant Attorney General. This hearing was originally set for Monday and he was going to appear himself, but because we had to change the meeting to today, Bob was not able to be here himself, but we are privileged that you're here. Again, I told the other witnesses you may feel free to summarize your testimony if you possibly can in order to save a little bit of time. Thank you.

Mr. SCHEUER. It will all be put in the record, the entire statement.

Mr. EYE. Thank you, Congressman Glickman and Congressman Scheuer.

My name is Robert Eye and I'm an Assistant Attorney General for the State of Kansas. Attorney General Stephan regrets that he may not be here personally to express his concerns to this committee regarding the Furley hazardous waste disposal site and facility. However, his record of vigilance and activity since early in his first term in office is indicative of his belief that this facility and hazardous waste disposal policy generally may not be serving the public interest.

Attorney General Stephan wishes to commend the actions of various citizens who live in the vicinity of the Furley site. Without their diligence, the facility might still be operating in such a way to be a threat to public safety. It was their concerns in 1980 which led Attorney General Stephan to demand an independent geological survey of the Furley site, a survey which raised questions that eventually led to the closing of the site. These citizens have a special interest in the facility because of their proximity to same. However, now many other sectors of our society are recognizing that the disposal of hazardous wastes is a matter that requires careful and comprehensive Government policy. My testimony on behalf of Attorney General Stephan shall focus on some of the problems associated with the Furley facility and possible reforms to avoid these problems in the future. I should add that my comments regarding the industry should not be taken as being necessarily critical of the present owners of the Furley site. Their problems here were inherited from the previous owners.

There is considerable uncertainty regarding the suitability of the present site's capability to contain hazardous waste. This uncertainty has caused turmoil in the lives of citizens who live near the site, numerous legal actions involving the time and resources of private citizens, State and local governments, and operators of the Furley site, and needless contamination of our environment with various hazardous chemicals.

Attorney General Stephan and others, including various experts, are concerned that the present site is not well suited to long-term storage of hazardous wastes. Please consider the following:

(*a*) In the fall of 1981, water samples from a spring discharging into Prairie Creek north of the site indicated significant levels of organic chemical contaminants;

(*b*) Subsequent tests and analyses indicated contaminants were moving offsite and, therefore, the Kansas Department of Health and Environment ordered the facility closed on January 18, 1982;

(*c*) A study commissioned by operators of the facility indicated the apparent source of leakage was a zone of contamination migrating northward from a mound of ground water under the treatment ponds;

(*d*) Samples collected from wells south and west of the site indicate hazardous waste contamination.

Remedial measures taken by the facility operators have had some effect in containing this contamination. However, this is only a tentative conclusion because of what the Kansas Legislative post-audit report on Furley termed "insufficient monitoring" of the pertinent wells.

The Furley hazardous waste disposal site has been characterized by a pattern of detection of contamination and a series of remedial measures designed, ostensibly, to prevent further contamination. Dr. Robert Berg, chairman of the geology department at Wichita State University, whom you will hear from later, among others, believes this pattern will likely persist because the site's subsurface topography and relationship to nearby streams make the area unsuitable for use as a hazardous-waste disposal facility. It should be noted that Dr. Berg made these statements in hearings before the Furley site was ever licensed, but his prophetic statements were ignored by State regulators.

According to Dr. Berg, the present site of the facility is incompatible with surface and subsurface topography and with drainage patterns associated with nearby streams. However, again according to Dr. Berg, there are areas due west of the present site which do not present the same topographical and drainage problems where a facility utilizing treatment ponds could likely have been safely located.

In Attorney General Stephan's opinion, many of the problems associated with the facility are directly related to the inappropriateness of the facility's site. We must remember the offsite contamination need not have occurred. The interaction between the waste storage and treatment modes and the area's ground water were directly responsible for the offsite contamination. Again, according to Dr. Berg, and now hindsight, the facility should have been located in an area where topographical and drainage features would work in favor of precluding offsite contamination instead of directly contributing to offsite contamination.

While the attorney general feels the facility's site is likely inappropriate and presents a major problem, it is by no means the only point of concern. He feels there have been problems concerning the State's ability to make independent decisions regarding the propriety of operational decisions. All too often the State has found itself deferring to the judgment of those individuals who have a direct interest in the continued operation of the facility. Such self-interest does not preclude objectivity. However, in this most important policy area, the attorney general believes it is prudent to proceed only after decisionmakers have had an opportunity to review technical and environmental conclusions based on objective and detached critical analysis. Such analyses are expensive. However, the State and Federal Governments must commit sufficient resources to insure that decisions regarding siting and operation of hazardous waste disposal facilities are made with the public safety and minimizing environmental damage as the major controlling criteria.

Other problems our State has experienced with the site and facility are well documented in sources as varied as a report from the Kansas Geological Survey, the Kansas legislative post-audit report, the United States Environmental Protection Agency audit, and numerous outstanding journalistic exposes in regional media. What these accounts have in common is that most raise questions concerning: (1) the suitability of the site; (2) the efficacy of the Government regulations; (3) the efficacy of remedial measures taken by operators of the facility; and (4) persistent doubts by nearby residents about the ability of the operators to contain contamination and the ability of the operators and/or Government to respond to problems as they arise.

Our purpose in meeting here and discussing the Furley hazardous-waste facility is to learn from these experiences and consider the changes necessary to avoid future problems. This is a public policy area that begs for reform. Hence, the balance of this testimony will be directed to discussing some means that Attorney General Stephan believes will protect the public and our environment.

Attorney General Stephan obviously considers the safe handling and disposal of hazardous-wastes to be one of our most important problems. There is a need for safe methods of hazardous-waste disposal. Moreover, he firmly believes the hazardous waste disposal problem is so endowed with the public's interest that it should not be relegated to the private sector of our society. In order to insure the public that these hazardous wastes are disposed of properly, a comprehensive planning and operations statutory program should be enacted. Attorney General Stephan believes the main features of such a program should include: (1) Government ownership and operation of hazardous waste disposal facilities; (2) imposition of strict siting requirements that require a comprehensive environmental impact analysis; (3) a commitment to continued research and development of technologies aimed at minimizing the environmental damage caused by disposal of such wastes. He recognizes that governmentalizing the hazardous waste disposal process will not obviate all problems. However, such a solution will minimize the incentive to cut corners in order to maximize profits. Moreover, such a solution will tend to inhibit any involvement of organized crime in the now lucrative business of hazardous waste disposal.

Essentially, the attorney general believes the problems associated with the disposal of hazardous-chemical wastes are quite comparable to those problems associated with the disposal of high level and transuranic nuclear wastes. Clearly, there is no plan to turn over nuclear-waste disposal to the private sector of our economy. To illustrate, we would direct attention to Public Law 97-425, the Nuclear Waste Policy Act of 1982, which was signed into law by the President on January 7, 1983. As members of this committee know, the act contemplates, among other things, a Federal Government nuclear-waste disposal facility at a site compatible with the goal of safely isolating these wastes from the biosphere. The act requires an extensive analysis of sites to determine their suitability for this purpose. The act also provides that generators of nuclear waste will be charged for disposal at the Federal Government facility. The attorney general believes it is wholly inconsistent to take such a comprehensive approach to the storage and disposal of nuclear wastes only to leave storage and disposal of equally dangerous chemical wastes to piecemeal, and frequently ineffective, regulation.

The public and generators of hazardous-chemical wastes must be assured that facilities for disposal of same will be available for so long as there is a need. Under our current system of private ownership and operation, no such assurance exists. Corporations come and go, but the operation of such a critical disposal facility must continue irrespective of corporate changes. The public must be able to look to an entity that will persist and deal with this problem as long as necessary. The attorney general is convinced that private corporations are not well suited to accomplish this critical task. Instead, the sites should be Government owned and operated to maximize public accountability and the likelihood that actions will be motivated by the need for public safety and environmental protection.

Attorney General Stephan calls on the Federal Government to take the lead in this critical area of public policy. The disposal and storage of hazardous wastes is a national problem that deserves a national solution. The companies that produce hazardous wastes are not contained within the individual State boundaries and neither is the threat of the waste itself. A uniform national policy is required. In addition, States often do not have the financial resources or expertise to adequately deal with the problems of hazardous waste. Attorney General Stephan urges Congress to devote the necessary resources and expertise as outlined above to solve this critical problem.

On behalf of Attorney General Stephan, I thank you for the opportunity to discuss this most important matter with you. I shall do my best to respond to any questions the committee may have.

[The prepared statement of Robert Vinson Eye follows:]

Hearing of Subcommittee on Natural Resources, Agriculture Research and Environment of House Committee on Science and Technology—Testimony Presented on Behalf of Attorney General Robert T. Stephan by Robert Vinson Eye, Assistant Attorney General, Wichita, Kans.—August 1, 1983

My name is Robert Vinson Eye, and I am an assistant attorney general for the state of Kansas. Attorney General Stephan regrets that he may not be here personally to express his concerns to this Committee regarding the Furley hazardous waste disposal site and facility. However, his record of vigilance and activity since early in his first term in office is indicative of his belief that this specific facility and hazardous waste disposal policy generally may not be serving the public interest.

Attorney General Stephan wishes to commend the actions of various citizens who live in the vicinity of the Furley site. Without their diligence, the facility might still be operating in such a way to be a threat to public safety. It was their concerns in 1980 which led Attorney General Stephan to demand an independent geological survey of the Furley site, a survey which raised questions that eventually led to the closing of the site. These citizens have a special interest in the facility because of their proximity to same. However, now, many other sectors of our society are recognizing that the disposal of hazardous wastes is a matter that requires careful and comprehensive government policy. My testimony on behalf of Attorney General Stephan shall focus on some of the problems associated with the Furley facility and possible reforms to avoid these problems in the future. I should add that my comments regarding the industry should not be taken as being necessarily critical of the present owners of the Furley site. Their problems here were inherited from the previous owners.

I.

There is considerable uncertainty regarding the suitability of the present site's capability to contain hazardous wastes. This uncertainty has caused turmoil in the lives of citizens who live near the site, numerous legal actions involving the time and resources of private citizens, state and local governments, and operators of the Furley site, and needless contamination of our environment with various hazardous chemicals.

Attorney General Stephan and others, including various experts, are concerned that the present site is not well suited to long-term storage of hazardous wastes. Consider the following:

a. In the Fall of 1981, water samples from a spring discharging into Prairie Creek north of the site indicated significant levels of organic chemical contaminants;

b. Subsequent tests and analyses indicated contaminants were moving off-site and, therefore, the Kansas Department of Health and Environment ordered the facility closed on January 18, 1982;

c. A study commissioned by operators of the facility indicated the apparent source of leakage was a zone of contamination migrating northward from a mound of groundwater under the treatment ponds;

d. Samples collected from wells south and west of the site indicate hazardous waste contamination.

Remedial measures taken by the facility operators have had some effect in containing this contamination. However, this is only a tentative conclusion because of what the Kansas Legislative Post Audit report on Furley termed "insufficient monitoring" of the pertinent wells.

The Furley hazardous waste disposal site has been characterized by a pattern of detection of contamination and a series of remedial measures designed, ostensibly, to prevent further contamination. Dr. Robert Berg, Chairman of the Geology Department at Wichita State University, among others, believes this pattern will likely persist because the site's subsurface topography and relationship to nearby streams make the area unsuitable for use as a hazardous waste disposal facility. It should be noted that Dr. Berg made these statements in hearings before the Furley site was ever licensed, but his prophetic statements were ignored by state regulators.

According to Dr. Berg, the present site of the facility is incompatible with surface and subsurface topography and with drainage patterns associated with nearby streams. However, again according to Dr. Berg, there are areas due west of the present site which do not present the same topographical and drainage problems where a facility utilizing treatment ponds could likely have been safely located.

In Attorney General Stephan's opinion, many of the problems associated with the facility are directly related to the inappropriateness of the facility's site. We must remember the off-site contamination need not have occurred. The interaction between the waste storage and treatment modes and the area's groundwater was directly responsible for the off-site contamination. Again, according to Dr. Berg, and now hindsight, the facility should have been located in an area where topographical and drainage features would work in favor of precluding off-site contamination instead of directly contributing to off-site contamination.

While the Attorney General feels the facility's site is likely inappropriate and presents a major problem, it is by no means the only point of concern. He feels there have been problems concerning the State's ability to make independent decisions regarding the propriety of operational decisions. All too often, the State has found itself deferring to the judgement of those individuals who have a direct interest in the continued operation of the facility. Such self-interest does not preclude objectivity. However, in this most important policy area, the Attorney General believes it is prudent to proceed only after decisionmakers have had an opportunity to review technical and environmental conclusions based on objective and detached critical analysis. Such analyses are expensive. However, the state and federal governments must commit sufficient resources to insure that decisions regarding siting and operation of hazardous waste disposal facilities are made with the public's safety and minimizing environmental damage as the major controlling criteria.

Other problems our State has experienced with the site and facility are well-documented in sources as varied as a report from the Kansas Geological Survey, the Kansas Legislative Post Audit report, the United States Environmental Protection Agency audit, and numerous outstanding journalistic exposes in regional media. What these accounts have in common is that most raise questions concerning (1) the suitability of the site; (2) the efficacy of government regulation; (3) the efficacy of remedial measures taken by operators of the facility; and (4) persistent doubts by nearby residents about the ability of the operators to contain contamination and the ability of the operators and/or government to respond to problems as they arise.

Our purpose in meeting here and discussing the Furley hazardous waste facility is to learn from these experiences and consider the changes necessary to avoid future problems. This is a public policy area that begs for reform. Hence, the balance of this testimony will be directed to discussing some means that Attorney General Stephan believes will protect the public and our environment.

II.

Attorney General Stephan obviously considers the safe handling and disposal of hazardous wastes to be one of our most important problems. There is a need for safe methods of hazardous waste disposal. Moreover, he firmly believes the hazardous waste disposal problem is so endowed with the public's interest that it should not be relegated to the private sector of our society. In order to assure the public that these hazardous wastes are disposed of properly, a comprehensive planning and operations statutory program should be enacted. Attorney General Stephan believes the main features of such a program should include: Do you believe the public should own all hazardous waste sites. How do you contrive? (1) Government ownership and operation of hazardous waste disposal facilities; (2) imposition of strict siting requirements that require a comprehensive environmental impact analysis; (3) a commitment to continued research and development of technologies aimed at minimizing the environmental damage caused by disposal of such wastes. He recognizes that governmentalizing the hazardous waste disposal process will not obviate all problems. However, such a solution will minimize the incentive to "cut corners" in order to maximize profits. Moreover, such a solution will tend to inhibit any involvement of organized crime in the now lucrative business of hazardous waste disposal.

Essentially, Attorney General Stephan believes the problems associated with the disposal of hazardous chemical wastes are quite comparable to those problems associated with disposal of high level and transuranic nuclear wastes. Clearly, there is no plan to turn over nuclear waste disposal to the private sector of our economy. To illustrate, we would direct attention to Public Law 97-425, the Nuclear Waste Policy Act of 1982, which was signed into law by the President on January 7, 1983. As members of this Committee know, the Act contemplates, inter alia, a federal government nuclear waste disposal facility at a site compatible with the goal of safely isolating these wastes from the biosphere. The Act requires an extensive analysis of sites to determine their suitability for this purpose. The Act also provides that generators of nuclear waste will be charged for disposal at the federal government facility. The Attorney General believes it is wholly inconsistent to take such a comprehensive approach to the storage and disposal of nuclear wastes only to leave storage and disposal of equally dangerous chemical wastes to piecemeal, and frequently ineffective, regulation.

The public and generators of hazardous chemical wastes must be assured that facilities for disposal of same will be available for so long as there is a need. Under our current system of private ownership and operation, no such assurance exists. Corporations come and go, but the operation of such a critical disposal facility must continue irrespective of corporate changes. The public must be able to look to an entity that will persist and deal with this problem as long as necessary. The Attorney General is convinced that private corporations are not well-suited to accomplish this critical task. Instead, the sites should be government-owned and operated to maximize public accountability and the likelihood that actions will be motivated by the need for public safety and environmental protection.

Attorney General Stephan calls on the federal government to take the lead in this critical area of public policy. The disposal and storage of hazardous wastes is a national problem that deserves a national solution. The companies that produce hazardous wastes are not contained within individual state boundaries and neither is the threat of the waste itself. A uniform national policy is required. In addition, states often do not have the financial resources or expertise to adequately deal with the problems of hazardous waste. Attorney General Stephan urges Congress to devote the necessary resources and expertise as outlined above to solve this critical problem.

On behalf of Attorney General Stephan, I thank you for the opportunity to discuss this most important matter with you. I shall do my best to respond to any questions the Committee may have.

Mr. **Glickman**. Mr. Eye, first of all I want to thank you for what I consider a very bold testimony. Essentially, you are calling for public, almost exclusively public domination of the management of hazardous waste disposal sites. The deprivation of those sites—we don't get into the specifics of how you would do that—and in effect, you are equating hazardous waste sites in some way with nuclear waste disposal in terms of the public policy implications, and I would just say that I think that does reflect an innovative, very bold approach to a problem. I'm sure there would be a lot of detractors to that approach. I'm not sure how you feel about it, but I think the attorney general should be commended for not just coming in here and saying it is bad to have hazardous waste in your water system and not recommending some solutions for it. He has recommended some extraordinarily bold solutions for it and ones that we'll take back to Washington with us.

I might tell you, as well as anybody else who is interested, that on the calendar of the House next week—I doubt if you're going to get to the Hazardous Waste Control and Enforcement Act, which basically would reauthorize and amend the Resource Conservation and Recovery Act. I seriously doubt whether the position you are espousing will find themselves into that act because they are much bolder than I think any of the suggestions that are being recommended, and Mr. Scheuer happens to serve on the committee of jurisdiction, the Commerce Committee, but I think the attorney general's position in this issue from the very beginning has been one of being very bold. I recall a letter that he wrote to Mr. Morris Kay, regional director of the EPA, in April of this year, and the first line is typical Bob Stephan, and he says, I have grown exasperated at officials advising that there is contamination of ground water around Furley, Kan., but people should not worry about it. I think that's a fairly typical Stephan line and one that usually gets its way into a appropriate public policy channels, so I don't have any questions of you. I would just congratulate you on your statement.

Mr. Scheuer, do you have any questions? I guess you have no questions. But the one concern, of course, is when you have the public take over these sites, you wonder how it would be paid for. Imminent domain, perhaps. What sort of compensation are you talking about?

Mr. EYE. Clearly, anytime the Government takes over a private operation like this, there are provisions for compensating the present owners, and that is done, not only in the area of—it's done in utility matters, it's done in anything that the Government can show a reasonable need to accomplish. As far as charging or as far as financing the operation of these facilities, we believe that the Nuclear Waste Policy Act of 1982 has some very promising and very innovative approaches to this.

One simply charges back to the generators of waste, costs associated with the disposing of same. That is precisely what the Policy Act contemplates. I can't quote you the section of it, I don't have the act in front of me; however, it contemplates that nuclear power plants that have waste fuel to dispose of will dispose of that fuel in this disposal site and then be charged for the costs of that disposal. Therefore, conceivably, no taxpayer dollars would be involved in financing this, or at least the generators of waste would carry a substantial burden toward the disposal of it.

Mr. GLICKMAN. Are we talking about State or Federal ownership of these sites?

Mr. EYE. The statement that I just read contemplates at this point Federal ownership; however, I do not think it would preclude State ownership if the Federal Government did not find it prudent nor advisable to move toward public ownership. Certainly I don't believe there is anything in at least Kansas law that would prevent Kansas from setting up a publicly owned hazardous waste facility and mandating that generators of certain hazardous wastes use it and be charged for using it.

Mr. GLICKMAN. Under Kansas law, could you set up one of these companies and deprivatize the Furley waste site?

Mr. EYE. Congressman Glickman, I'll be really honest with you. I do not know the answer to that question.

Mr. GLICKMAN. How would you come up with a value for the site, like the value for the Furley site? Would it be a cost value? You don't have to if, you know, if you don't have the answer.

Mr. EYE. I think the dollar cost involved should be secondary to the goal that's trying to be accomplished. We have heard testimony here replete with the idea that many dollars have already been spent at trying to remedy this problem at Furley. Indeed, there is also considerable authority that indicates that the problem at Furley need not ever have arisen had adequate steps been taken in the planning process. Therefore, certainly now we are throwing conceivably very good money after very bad money, and a comprehensive siting and operational law that was enacted, which contemplates a Government control, would hopefully obviate many of those initial problems.

Mr. GLICKMAN. I don't disagree with you. You have, of course, unique problems in the disposal of high-level waste, but you really have no waste site. You have a bunch of temporary receptacles of waste, but I think there are some analyses, and even your testimony is extraordinarily useful. We appreciate your coming down here today.

Mr. EYE. Thank you very much also.

Mr. GLICKMAN. We now have our witness from the EPA, Mr. Robert Morby.

Mr. Morby, thank you for being here. We appreciate your coming down here, also your cooperation with members of our subcommittee, and your statement is not very long. You may feel free to read it or summarize it as you wish.

Mr. MORBY. I'll get the right one. Thank you, Mr. Chairman, Congressman Glickman. It is my pleasure to be here to represent the Environmental Protection Agency.

Before beginning my comments, I would like to express Morris Kay's, our regional administrator regrets that he was not able to be here today. He, too, was expecting that it would be held the first part of next week and I think had full intentions of participating, but due to a scheduling problem was not able to be here. I would also introduce Bob Stewart, to my left. He is a staff engineer that has been closely associated in working with the State of Kansas on this site cleanup.

I would like to thank you, the subcommittee, for the opportunity to present information about EPA's role in the investigation of and the cleanup of the NIES hazardous waste site near Furley, Kans.

When Congress passed the Resource Conservation and Recovery Act in 1976, it was very evident that the States would have a major role in implementing a national hazardous waste management program. I am pleased to report to the subcommittee that the State of Kansas has been a leader in region VII in developing and implementing environmental programs. For example, Kansas accepted delegation for point source discharge control under the National Pollutant Discharge Elimination System in 1974. Kansas was the second State in region VII to seek and receive delegation of authority to operate phase I of interim authorization under RCRA in September 1981.

Phase I of interim authorization provides full authority to the State to regulate treatment, storage and disposal facilities in lieu of EPA. Basically the State of Kansas has all the delegated authority to manage hazardous waste except the authority to issue RCRA permits. Since the State was delegated interim authorization in

September 1981, and the Kansas Department of Health and Environment had issued the original State permit for the KIES or the Kansas Industrial Environmental Services site in Furley, Kans., it only seemed appropriate that the State of Kansas should take the lead on the investigation and cleanup of the site. Kansas agreed and they expressed their desire to take a lead, and EPA was in full concurrence. It should be noted that the name of the site was changed to the National Industrial Environmental Services in October 1980, rather than 1981, in the testimony.

In the fall of 1981, KDHE requested the assistance of EPA in doing some analyses of some samples collected offsite from the NIES facility. These EPA results led KDHE to do some further expedited investigation of site involving both installation of new wells along the northern boundary of the site and additional analytical work.

The State of Kansas concluded in January 1982 that the site was contaminating the ground water and issued an order that same month which prohibited the facility from receiving any more hazardous waste. The KDHE has maintained throughout the investigation and cleanup it will not consider reopening of the site until the cleanup action has been demonstrated to be fully effective.

EPA, along with the Kansas Geological Survey, and the Wichita-Sedgwick County Department of Health have provided professional counsel and commentary in a consulting role to KDHE. EPA, at the request of the State, has provided laboratory analysis of many ground water samples from both onsite and offsite wells. We stand ready to continue this kind of technical assistance to the State.

On January 26, 1983, EPA's rules for land disposal of hazardous waste becomes effective, and we were able to require the submission of a part B application. Until this time the site had operated under the authority of a State permit and interim status from EPA. Interim status under the Resource Conservation and Recovery Act was granted to those facilities who timely notified EPA they were in the business of hazardous waste management, were in existence on November 19, 1980, and submitted an abbreviated application for a permit. The submission of a part B application requires the facility to upgrade to meet all the new requirements of EPA's rules and requirements.

Since EPA retains the Federal permitting authority, on March 9, 1983, EPA and KDHE jointly requested from Chemical Waste Management, Inc., the submission of a full part B application for the Furley, Kans., site, or a closure plan to close the facility. That permit application is due to both KDHE and EPA September 10, 1983.

As the site investigation and cleanup actions have progressed since January 1982, we have attended many meetings on the project. During these meetings, and in comment letters, we have provided comments on all aspects of the work. Some of our comments were adopted but many were not. In most cases, we have not been formally told why our comments were rejected.

Analytical data completed by KDHE on samples taken from onsite ground water wells in August 1982 were not provided to us until April 1983. At that time, Senator Dole asked us to take a closer look at the KDHE handling of the cleanup. So in May 1983, several members of our staff conducted a hazardous waste program audit which has been mentioned here today. We now have that final report, which includes our responses to official comments of the department. In regard to NIES, the audit found a general lack of documentation of the files and project decisions, a review procedure that failed to address all RCRA requirements, a lack of information sharing with all parties, very little involvement of KDHE legal staff, and a failure to obtain EPA approval of a contract which KDHE has with the consultant.

The final EPA audit report recommends that these items be rectified and that site cleanup actions be completed as soon as possible. This means that in the near term, that the treatment and evaporation ponds should be closed out, and in the longer term, additional actions be taken to clean up the site. All of the work done so far has been directed toward the shallow aquifer, and it may be necessary to take remedial actions on a deeper aquifer. A long-range ground water monitoring plan should be completed and approved. Better public notification and meetings are necessary.

In summary, the site investigations and cleanup work authorized by KDHE have been proceeding and we have given KDHE technical comments on the site activities. We are now at a crucial stage when the treatment and evaporation ponds need to be decommissioned, results to date should be assessed for the effects of cleanup efforts and seasonal variations, and the cleanup effort must be redirected as needed to prevent additional offsite contamination and to clean up the existing contamination.

This concludes my formal statement. Bob Stewart, a staff engineer, and I are both available to try to answer any questions the committee might have.

[The prepared statement of Mr. Morby follows:]

STATEMENT OF
ROBERT L. MORBY
CHIEF, WASTE MANAGEMENT BRANCH, REGION VII
ENVIRONMENTAL PROTECTION AGENCY
BEFORE THE
SUBCOMMITTEE ON NATURAL RESOURCES, AGRICULTURE RESEARCH & ENVIRONMENT
COMMITTEE ON SCIENCE AND TECHNOLOGY

WICHITA, KANSAS
JULY 30, 1983

Good morning, Mr. Chairman and Members of the Subcommittee. I am Robert Morby, Chief, Waste Management Branch, Environmental Protection Agency (EPA) Region VII, Kansas City, Missouri. I want to thank the Subcommittee for this opportunity to present information about EPA's role in the investigation and cleanup of the National Industrial Environmental Services (NIES) hazardous waste disposal site near Furley, Kansas.

When Congress passed the Resource Conservation and Recovery Act (RCRA) in 1976, it was very evident that the States would have a major role in implementing a national hazardous waste management program. I am pleased to report to the Subcommittee that the State of Kansas has been a leader in Region VII in developing and implementing environmental programs. For example, Kansas accepted delegation for point source discharge control under the National Pollutant Discharge Elimination System (NPDES) in 1974. Kansas was the second State in Region VII to seek and receive delegation of authority to operate Phase 1 of interim authorization under RCRA in September 1981.

Phase 1 of interim authorization provides full authority to the State to regulate treatment, storage, and disposal (TSD) facilities in lieu of EPA. Basically the State of Kansas has all the delegated authority to manage hazardous waste except the authority to issue RCRA permits. Since the State was delegated interim authorization in September 1981, and the Kansas Department of Health and Environment (KDHE) had issued the original State permit for the Kansas Industrial Environmental Services (KIES) site in Furley, Kansas, it only seemed appropriate that the State of Kansas should take the lead on investigation and clean-up of the site. Kansas expressed the desire to take the lead role and EPA agreed. It should be noted that the name of the site was changed to the National Industrial Environmental Services (NIES) in October 1981.

In the fall of 1981 KDHE requested the assistance of EPA in doing some analyses on some samples collected off-site from the NIES facility. These EPA results led KDHE to do some further expedited investigation of site involving both installation of new wells along the northern boundary of the site and additional analytical work.

The State of Kansas concluded in January 1982 that the site was contaminating the groundwater and issued an order that same month which prohibited the facility from receiving any more hazardous waste. The KDHE has maintained throughout the investigation and clean-up it will not consider reopening of the site until the clean-up action has been demonstrated to be fully effective.

EPA has acted under the concept that KDHE has had the lead responsibility for the site clean-up. EPA, along with the Kansas Geological Survey, and the Wichita-Sedgwick County Department of Health have provided professional counsel and commentary in a consulting role to KDHE. EPA, at the request of the State has provided laboratory analysis of many groundwater samples from both on-site and off-site wells. We stand ready to continue this kind of technical assistance.

On January 26, 1983, EPA's rules for land disposal of hazardous waste became effective, and we were able to require the submission of a Part B application. Until this time the site had operated under the authority of a State permit and interim status from EPA. Interim Status under the Resource Conservation and Recovery Act was granted to those facilities who timely notified EPA they were in the business of hazardous waste management, were in existence on November 19, 1980, and submitted an abbreviated application for a permit. The submission of a Part B application requires the facility to upgrade to meet all the new requirements of EPA's rules and regulations.

Since EPA retains the Federal permitting authority, on March 9, 1983, EPA and KDHE jointly requested from Chemical Waste Management, Inc. the submission of a full Part B application for the Furley, Kansas site, or a closure plan to close the facility. The permit application is due on September 10, 1983.

As the site investigations and clean-up actions have progressed since January 1982, we have attended many meetings on the project. During these meetings, and in comment letters, we have provided comments on all aspects of the work. Some of our comments were adopted, but many were not. In most cases, we have not been formally told why our comments were rejected.

Analytical data completed by KDHE on samples taken from on-site groundwater wells in August 1982 were not provided to us until April 1983. At that time, Senator Dole asked us to take a closer look at the KDHE handling of the cleanup. So in May 1983, several members of our staff conducted a hazardous waste program audit of the KDHE. We now have the final report, which includes our responses to official comments of the Department. In regard to NIES, the audit found a general lack of documentation of files and project decisions, a review procedure that failed to address all RCRA requirements, a lack of information sharing with all parties, very little involvement of KDHE legal staff, and a failure to obtain EPA approval of a contract to a KDHE consultant.

The final EPA audit report recommends that these items be rectified, and that site cleanup actions be completed as soon as possible. This means that, in the near term, the treatment and evaporation ponds should be closed out, and in the longer term, additional actions be taken to clean up the site. All of the work done so far has been directed toward the shallow aquifer (40 feet below the surface). It may be necessary to take remedial actions on a deeper aquifer. A long-range groundwater monitoring plan should be completed and approved. Better public notification and meetings are necessary.

In summary, the site investigations and cleanup work authorized by KDHE have been proceeding and we have given KDHE technical comments on site activities. We are now at a crucial stage, when (1) the treatment and evaporation ponds need to be decommissioned, (2) results to date should be assessed for the effects of cleanup efforts and seasonal variations, and (3) the cleanup effort must be redirected as needed to prevent additional off-site contamination and to clean up the existing contamination.

This concludes my statement. Bob Stewart, Staff Engineer, or I will be happy to respond to any questions you may have.

Mr. GLICKMAN. Thank you, Mr. Morby. Let me ask you a couple of specific questions. I understand the EPA recently conducted the testing at the Furley site to determine the presence of dioxin. Was dioxin found?

Mr. MORBY. At the request of the Department of Health and Environment that we go to the site as late as last week where we selected about 12 samples from ground water monitoring wells and the trenches to be submitted for analytical work, to determine whether or not they did contain dioxin. You have heard earlier today discussion about analyses that were done by EPA on dioxin at the site. Those were at a higher detection level than these that are now being done will be done at what we call a high resolution or a much lower detection level.

Mr. GLICKMAN. They would be able to detect the levels more in line with perhaps recent EPA studies concerning levels of dioxin necessary to cause cancer, let's say some of the levels that Mr. Scheuer talked about?

Mr. MORBY. Those are a level—I have seen the same report that the chairman has spoken about. The analytical capabilities, to my knowledge, takes the detection level down to about the low parts per billion level.

Mr. GLICKMAN. That's what you're—what specifically will you be able to determine from these dioxin levels, how far can you take that down?

Mr. MORBY. We can take it to a low level parts per billion.

Mr. GLICKMAN. Now, Mr. Scheuer referred to parts per quintillion?

Mr. MORBY. Yes, to the minus 18. I have not seen any place yet, sir, that that has been done.

Mr. SCHEUER. We were assured at hearings just a couple of days ago by Dr. Erwin Selicoff [sp] of the Mount Sinai Medical School that that is easily within the range of our current measuring capability.

Mr. MORBY. I'm just not aware of it. I have seen dioxin samples given, the work that EPA has done in the State of Missouri, and all of the work that's gone on there, and the lowest that I've seen done is in the detection level into the low parts per billion range, but the tests that we have requested are high resolution.

Mr. GLICKMAN. I assume they are the highest resolution that you think you can get?

Mr. MORBY. The best I can get, sir.

Mr. GLICKMAN. Now, did you test for dioxin at well site No. 220?

Mr. MORBY. There was no samples checked at A-220, sir.

Mr. GLICKMAN. Do you know why no sample was checked there, not collected there?

Mr. MORBY. In discussions with Mr. Jim Aiken, who is formerly with the Kansas Department of Health and Environment, it was agreed upon between myself and he that that would be analyzed, but when our sampling team arrived at the site, there was confusion of whether or not that had been approved, and we were not then allowed to collect that sample, or take that sample. The sample was not available.

Mr. GLICKMAN. You say you were not allowed, somebody stopped you?

Mr. **Morby**. I think the official who was with our team indicated that it was not on his sampling list that he had before him, which would indicate which samples would be collected.

Mr. **Glickman**. What official are you talking about that was with you?

Mr. **Morby**. It's my understanding that Mr. Gray was the individual that was onsite.

Mr. **Glickman**. Mr. Gray with the KDHE, Kansas Department?

Mr. **Morby**. Yes, sir.

Mr. **Glickman**. The same one that I referred to in that letter; were you here when I referred to that letter?

Mr. **Morby**. I did hear the indication of the letter that you read, yes.

Mr. **Glickman**. Well, Secretary Sabol has indicated that she would like to have the well site tested. I assume that you will.

Mr. **Morby**. I think, as our testimony indicated, we'll be receptive to requests from the department and try to work with them on that.

Mr. **Glickman**. In your view, do you think the ground water contamination of the Furley site is irreversible?

Mr. **Morby**. I guess I would ask you to amplify on that just a little bit, sir; I don't understand your question.

Mr. **Glickman**. You know there has been some contamination, ground water contamination. Can it be stopped? Can cleanup stop it and prevent it from happening in the future or do you think we are talking about what contamination has occurred to the present not been stopped technically?

Mr. **Morby**. I think there are portions of the contamination that has escaped the site, that the current cleanup plan does not expect to recapture. I think the technology exists today that we can intercept leachate plumes and collect contaminated ground water.

Mr. **Glickman**. Let me go back for a moment to this situation when you were to inspect site 220, and you indicated Mr. Gray said it was not on the list. It concerns me. Mr. Gray is an official of the Division of Environment and he told you that you couldn't do an inspection, I mean a dioxin test on 220?

Mr. **Morby**. No; Mr. Gray did not tell Robert Morby that he—I think the communications that we had was from our field investigative team, that A-220 was not sampled as a part of that trip, that we didn't understand and we inquired a little bit further, and in inquiring, it was our understanding that Mr. Gray did not have a list that indicated that particular well should be sampled.

Mr. **Glickman**. I wonder, were any wells sampled that were not on the list?

Mr. **Morby**. I think they had followed, with the exception of that one well, everything was sampled, sir.

Mr. **Glickman**. Was that the only well adjacent to an area where dioxin might be expected to be found that was not tested for dioxin?

Mr. **Morby**. Well, the cutoff trench itself was sampled, sir, which would be expected to receive leachate from many different places, so I think the possibilities still exist that we'll have a chance to encounter that if it is available in that trench.

Mr. **Glickman**. But you were concerned enough to make inquiry as to why it wasn't sampled, right?

Mr. **Morby**. 220, sir, is the well on the site that's had the highest contamination, roughly at 2½ percent, or 2-plus percent leachate contamination, and given that and the fact that these were volatile compounds, we thought that it would be appropriate, and I think Mr. Aiken agreed with that, that that particular well be sampled.

Mr. **Glickman**. Well, I don't know if I have the facts regarding this straight, and I assume the well is going to be sampled. I find it highly extraordinary that this well site was not sampled inasmuch as it was close to an area of known contamination of chemicals that could create dioxin, and you know that anybody would veto, whether it be State or Federal official, would veto a review of a testing site there.

Mr. **Morby**. I have spoken to Mr. Gray about this issue a little bit myself, and I think his response to me goes something to the effect that, since the cutoff trench was sampled, that that would provide similar analytical results.

Mr. **Glickman**. You didn't feel that way; you felt in your own mind——

Mr. **Morby**. That's where Mr. Aiken and I agreed. I think the other point——

Mr. **Glickman**. Mr. Aiken is with the State, right?

Mr. **Morby**. He was the former director of the bureau or position of the environment site of the KDHE.

Mr. **Glickman**. OK. Well, I've made my point and I think now we need to go ahead and test that site. Mrs. Dienst of Furley asked the EPA do a ground waer evaluation at the Furley site, a fairly comprehensive one, and I want your comment on that.

Mr. **Morby**. I too heard the request for that. I think what we have done in the past, and I expect that we would do in the future, is those requests that are coming from the site. And rather than trying to have a duplication of efforts, what's going on, we would like to hear from KDHE and what their desire is on that before just commencing.

Mr. **Glickman**. Have you received any requests from anybody to do such a ground water evaluation?

Mr. **Morby**. I guess I would have to know the full complement of what Sharilyn had in mind. Sharilyn has asked Mr. Kay on occasion to do several activities at the site, and I think those that have come back through the State to us we have tried to honor and carry it on, sir.

Mr. **Glickman**. I think that perhaps myself and maybe Mr. Scheuer and maybe other members of the Kansas delegation will want to pursue this matter.

Mr. **Morby**. I'll surely take home the concerns that were expressed here to Morris Kay and let him know that this personal request was made and make him aware of it.

Mr. **Glickman**. Also, Mrs. Dienst requested that the EPA declare the site as an imminent and substantial endangerment to the public health and environment under section 7003 of the Resource Conservation and Recovery Act. Does the Furley site qualify for this treatment? I assume—does the Furley site qualify for this?

Mr. **Morby**. Well, that is a legal determination whether or not it is an imminent and substantial endangerment. I think I would explain that the site does have a comparable authority and we would hope to let them have the first opportunity to give that consideration, sir.

Mr. **Glickman**. Now, what would be the legal status of being declared that under the Conservation Act?

Mr. **Morby**. Well, there are provisions that are allowed that's an enforcement portion of the Resource Conservation and Recovery Act that allows you to use either administrative orders or civil referrals to go into court and seek cleanup under—the agency has used that in numerous places throughout the country.

Mr. **Glickman**. OK. Thank you very much for being here, we appreciate it.

We'll proceed in order of Dr. Berg, Mr. Wilson, and Ms. Butler. That's the way you are listed on the witness chart, and again, all of your statements will appear in the record in their entirety, so if psosible, we would like to keep your statements down to maybe 10 minutes or so, so we would have time to ask you questions. So why don't you go ahead and, let's see, Dr. Berg, you are first, so why don't you proceed.

Mr. **Berg**. I have some illustrations that will shorten and clarify the response considerably, if we may take just a minute to get that set up.

Mr. **Glickman**. You want to let one of the other witnesses go first, then? Why doesn't Ms. Butler, why don't you go ahead and then we will wait till the monitor is ready for Dr. Berg.

STATEMENT OF JANIS BUTLER, NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS ENVIRONMENTAL POLICY TASK FORCE

Ms. **Butler**. My name is Janis Butler. I represent the Kansas Engineering Society and I serve on the National Society of Professional Engineers Environmental Policy Task Force.

The Kansas Engineering Society is pleased to submit comments on hazardous waste management to the committee. During the past year, the National Society of Professional Engineers has set up a special task force to study hazardous waste management and make recommendations to our board of directors regarding an official NSPE position. Last January the NSPE board formally adopted a policy statement on this issue which has been adopted as the position on hazardous waste by the Kansas Engineering Society. This position paper is the basis for our testimony.

We generally support the goals of the Resource Conservation and Recovery Act of 1976. However, implementation of this landmark legislation has revealed major deficiencies in the Nation's hazardous waste management program, deficiencies which Congress should address in this year's reauthorization proposal.

As an association which is deeply committed to the development and application of technology to help solve our Nation's problems, NSPE is particularly concerned over the three important aspects of the current implementation of RCRA.

First, we believe that too little emphasis has been placed on alternatives to the land disposal of untreated hazardous wastes.

Second, the delisting process is inadequate and unreasonably burdensome on industry.

Third, the small generator exemption is too broad and does not adequately take into account the characteristics of individual waste products.

We would like to discuss each of the points in greater detail.

The first issue concerns alternatives to landfills. Properly constructed and regulated Kansas waste landfills, by necessity, continue to play a role in our national hazardous waste management program for the foreseeable future. For a few types of waste, there simply are no alternatives. For many other substances, recycling and detoxification technologies exist, but facilities are not yet in place.

Nevertheless, a growing body of evidence suggests that landfills, even those meeting all Federal standards and utilitize state-of-the-art technology, cannot be guaranteed against leakage. Most recently, reports of the Office of Technology Assessment and the National Research Council have strongly questioned the wisdom of our current dependence on land disposal of untreated hazardous wastes. Failure of these facilities pose a severe threat to our ground-water resources which, once contaminated, are extremely difficult to restore to potable quality.

Fortunately, for many waste types, there are proven engineering procedures for recovery, detoxification, or destruction of hazardous materials. Some wastes are amenable to recycle or reuse in the original process or in other processes.

As has been mentioned, the recovery of solvents is being widely practiced today. The testimony previously by Waste Management this morning regarding their plan to landfill only detoxified and stabilized wastes, and I emphasize that they specifically stated wastes no longer in the hazardous state in the Furley site, if it is allowed to reopen, is a workable plan.

Leaking hazardous waste landfills present the most difficult of all waste problems to solve. The mixing of every conceivable kind and type of hazardous waste in landfills presents a problem that almost defies solution. But creative solutions must be found and applied to detoxify this smorgasboard of wastes in failed landfills.

While containment of this waste is the most readily available solution, detoxification of previously landfilled hazardous wastes is ultimately the final solution to the leaking landfill, coupled with detoxification treatment of any polluted ground-waters that might be present.

Because these superior waste management technologies are available, NSPE supports a national policy which would disallow land burial for materials that present a significant risk to the environment, and for which economically achievable, enviornmentally sound alternatives exist. The Environmental Protection Agency should also promote that transfer of recycling and detoxification technology.

When we refer to "economically achievable" alternatives, we are asking the Congress and the Environmental Protection Agency to make some difficult determinations regarding the financial burden to be placed on industry. Clearly, current EPA policies which allow extensive use of land burial, primarily because that is the least expensive option in the short run, is inadequate.

Not only does it threaten human health and the environment, but also encourages practices which would result in extremely expensive cleanup efforts and litigation in the not-too-distant future. In fact, we can claim that landfills are the least expensive method of disposing of hazardous wastes only if we are willing to base our calculations on a very short time frame.

On the other hand, NSPE certainly does not advocate that disposal requirements be so stringent and inflexible that industry, especially smaller firms, are faced with severe financial hardships. We support efforts by EPA officials to strengthen the agency's capacity to assess the degree of risk associated with individual waste streams, and to tailor disposal regulations accordingly.

In addition, NSPE advocates that the Federal Government provide economic incentives to private industry to encourage the installation of onsite treatment facilities and regional waste treatment centers. We encourage the Congress to consider tax incentives and revenue bonds for this purpose, and we are encouraged to note that legislation along these lines has been introduced in both the 97th and the 98th Congresses.

The second principal aspects of the RCRA regulations which concerns NSPE is the procedure for delisting treated or detoxified wastes.

The current EPA requirements and procedures for delisting treated or detoxified waste materials that have been listed as hazardous is an inefficient and wasteful bureaucratic exercise. The agency should emphasize development of a more efficient process for removing from regulation those substances which can be safely disposed as nonhazardous. Specific guidelines for delisting petitions should be published, and properly prepared and submitted petitions should be acted upon expeditiously.

The third major aspect of concern to NSPE is that of the small generator exemption.

We believe that the current small quantity generator exemption is too broad. By exempting generators of less than 1,000 kilograms per month from regulation, current EPA rules permit the improper disposal of amounts of harmful wastes which cumulatively represent a significant percentage of all hazardous waste produced.

However, total elimination of the exemption may not be feasible at this time, recognizing that the U.S. Environmental Protection Agency and its counterparts on the State level do not have the resources to regulate all generators.

The 1,000-kilogram-per-month, across-the-board limit, is not appropriate.

NSPE supports the lowering of the small generator limit to 100 kilograms per month, as has been done in Kansas and several other States.

Some wastes are so hazardous or toxic that their disposal in any quantity should be disallowed.

NSPE advocates that EPA closely restrict the exemption for small generators of wastes which pose a significant hazard to human health and the environment. The exemption should be geared to the degree of risk of individual waste streams.

In summary, we commend the committee for giving its close attention to this important issue. While the basic goals of the RCRA Act remain sound, many aspects of this statute require extensive review by the Congress. We hope our statement will prove useful to the subcommittee in its efforts to correct the flaws that are currently in our hazardous waste management program.

[The prepared statement of Ms. Butler follows:]

TESTIMONY SUBMITTED BY JANIS C. BUTLER, P.E. MEMBER, NSPE ENVIRONMENTAL POLICY TASK FORCE

My name is Janis Butler. I represent the Kansas Engineering Society and I serve on the National Society of Professional Engineers Environmental Policy Task Force.

The Kansas Engineering Society (KES) is pleased to submit comments on Hazardous Waste Management to the Committee. Our Society was founded in 1934 as an organization dedicated to advancing the social and professional environment of the engineering profession and to serve the public welfare by offering engineering viewpoints on matters of public policy in which engineering background and expertise are pertinent. Our National Society is composed of 80,000 members engaged in virtually every aspect of engineering practice and has affiliated state societies with similar purpose in every state and more than 500 local chapters. Many of our members are engaged in some aspect of hazardous waste management through their work in private practices, industry, education, and government at all levels.

During the past year, the National Society of Professional Engineers (NSPE) has set up a special task force to study hazardous waste management and make recommendations to our Board of Directors regarding an official NSPE position. Last January, the NSPE Board formally adopted a policy statement on this issue which has been adopted as the position on hazardous waste by the Kansas Engineering Society. This position paper is the basis of our testimony.

We generally support the goals of the Resource Conservation and Recovery Act of 1976. However, implementation of this landmark legislation has revealed major deficiencies in the nation's hazardous waste management program, deficiencies which Congress should address in this year's reauthorization proposal.

As an association which is deeply committed to the development and application of technology to help solve our nation's problems, NSPE is particularly concerned over three important aspects of the current implementation of RCRA.

First, we believe that too little emphasis has been placed on alternatives to land disposal of untreated hazardous wastes.

Second, the delisting process is inadequate and unreasonably burdensome on industry.

Third, the small generator exemption is too broad and does not adequately take into account the characteristics of individual waste products.

We would like to discuss each of the points in greater detail.

The first issue concerns Alternatives to Landfills: Properly constructed and regulated landfills, by necessity, will continue to play a role in our national hazardous waste management program for the foreseeable future. For a few types of wastes, there simply are no alternatives. For many other substances, recycling and detoxification technologies exist, but facilities are not yet in place.

Nevertheless, a growing body of evidence suggests that landfills, even those meeting all federal standards and utilizing state-of-the-art technology, cannot be guaranteed against leakage. Most recently, reports by the Office of Technology Assessment and the National Research Council have strongly questioned the wisdom of our current dependence on land disposal of untreated hazardous wastes. Failure of these facilities poses a severe threat to our groundwater resources which, once contaminated, are extremely difficult to restore to potable quality.

Fortunately, for many waste types, there are proven engineering procedures for recovery, detoxification, or destruction of hazardous materials. Some wastes are amenable to recycle or reuse in the original process or in other processes. The recovery of solvents by distillation is being widely practices today. Solvents that are not suitable for recovery may be candidates for incineration, which destroys the waste and, in some cases, provides recoverable heat energy.

Many non-recoverable hazardous wastes can be detoxified by chemical treatment, such as precipitation of metals and oxidation of organics, and the resultant non-hazardous wastes can be safely buried in landfills. Detoxification also can be achieved through stabilization of complex wastes by the addition of materials that bind up the waste so that it will not leach hazardous substances when exposed in the natural environment.

The Alternative Hazardous Waste Processing and Disposal Report on Paint and Printing Wastes, which Secretary Sabol Released today, discusses the detoxification and reuse of paint wastes. This is a good example of existing treatment technology which can be utilized to render this very large class of hazardous wastes non-hazardous, and thus allow their burial as non-hazardous wastes, without fear of future leaching of hazardous or toxic chemicals into the landfill and into the groundwater.

Leaking hazardous waste landfills present the most difficult of all waste problems to solve. The mixing of every conceivable kind and type of hazardous waste in landfills presents a problem that almost defies solution. But, creative solutions must be found and applied to detoxify this smorgasbord of wastes in failed landfills.

While containment of these wastes is the most readily available solution, detoxification of previously landfilled hazardous wastes is ultimately the final; solution to the leaking landfill, coupled with detoxification treatment of any polluted groundwaters that might be present.

Because these superior waste management technologies are available, NSPE supports a national policy which would disallow land burial for materials that present a significant risk to the environment, and for which economocially achievable, environmentally sound alternatives exist. The Environmental Protection Agency should also promote that transfer of recycling and detoxification technology.

When we refer to "economically achievable" alternatives, we are asking the Congress and the Environmental Protection Agency to make some difficult determinations regarding the financial burden to be placed on industry. Clearly, current EPA policies, which allow extensive use of land burial primarily because that is the least expensive option in the short run, is inadequate. Not only does it threaten human health and the environment, but also encourages practices which would result in extremely expensive clean-up efforts and litigation in the not too distant future. In fact, we can claim that landfills are the least expensive method for disposing hazardous waste only if we are willing to base our calculations on a very short time frame.

On the other hand, NSPE certainly does not advocate that disposal requirements be so stringent and inflexible that industry, especially smaller firms, are faced with severe financial hardships. We support efforts by EPA officials to strengthen the agency's capacity to assess the degree-of-risk associated with individual waste streams and to tailor disposal regulations accordingly.

In addition, NSPE advocates that the Federal government provide economic incentives to private industry to encourage the installation of on-site treatment facilities and regional waste treatment centers. We encourage the Congress to consider tax incentives and revenue bonds for this pourpose, and we are encouraged to note that legislation along these lines has been introduced in both the 97th and 98th Congresses.

The second principal aspect of the RCRA regulations which concers NSPE is the procedure for delisting Treated or Detoxified Wastes: The current EPA requirements and procedures for delisting treated or detoxified waste materials that have been listed as hazardous is an inefficient and wasteful bureaucratic exercise. The agency should emphasize development of a more efficient process for removing from regulation those substances which can be safely disposed as non-hazardous waste. Specific guidelines for delisting petitions should be published, and properly prepared and submitted petitions should be acted upon within three months.

The third major aspect of concern to NSPE is that of the Small Generator Exemption: We believe that the current small quantity generator exemption is too broad. By exempting generators of less than 1,000 kilograms per month from regulation, current EPA rules permit the improper disposal of amounts of harmful wastes which cumulatively represent a significant percentage of all hazardous wastes produced.

However, total elimination of the exemption may not be feasible at this time, recognizing that the U.S. Environmental Protection Agency and its counterparts on the state level do not have the resources to regulate all generators.

The 1,000 kilogram per month, across-the-board limit, is not appropriate.

NSPE supports the lowering of the small generator limit to 100 kilograms per month, as has been done in Kansas and several other states.

Some wastes are so hazardous or toxic that their disposal in any quantity should be disallowed.

NSPE advocates that EPA closely restrict the exemption for small generators of wastes which pose a significant hazard to human health and the environment. The exemption should be geared to the degree of risk of individual waste streams.

In summary, we commend the Subcommittee for giving its close attention to this important issue. While the basic goals of the Resource Conservation and Recovery Act of 1976 remain sound, many aspects of this statute require extensive review by the Congress. We hope our statement will prove useful to the Subcommittee in its efforts to correct the flaws in our current hazardous waste management program.

STATEMENT OF INTRODUCTION

The Kansas Engineering Society is an association composed of 1400 Licensed Engineers. This group of professionals work in government, industry, construction, education and private practice.

The mission of the Society is to promote Professionalism and encourage appropriate public policy action on issues that affect the profession and the public's welfare.

One of our Society's key committees is the Environmental Resources Committee composed of more than 18 Professional Engineers representing both government agencies and areas of private practice expertise. Issues such as Water Conservation, Hazardous Waste Treatment, Water quality, and Water Pricing are only a few of the topics this committee has studied and reviewed. As a result of this committee's ongoing labors the Kansas Engineering Society has adopted several policy task forces in areas affecting the environment.

More than four years ago this committee drafted its first study of Hazardous Waste disposal and presented its views to the Kansas Legislature. Based upon several of the recommendations of the committee the Kansas Hazardous Waste Act was updated and broadened in scope by the Kansas Legislature.

As a result of this action and activity the National Society of Professional Engineers requested that Kansas name one of its members to aid the National Society, composed of more than 80,000 Professional Engineers, in preparing a National policy statement on Hazardous Waste Disposal.

Janis Butler, P.E., served on that National committee and was largely responsible for the drafting of the National policy statement adopted by NSPE in January of this year at its annual winter meeting in Puerto Rico.

The Kansas Engineering Society—on the recommendation of its Environmental Resources Committee—reviewed the National policy statement and this summer adopted the same as its current statement of policy on Hazardous Waste Landfill Disposal.

The National Society of
Professional Engineers

Position on Hazardous Waste Management

Foreword

The "NSPE Position on Hazardous Waste Management" expresses the Society's official views on the legislation and regulations which govern the recovery, detoxification, and disposal of hazardous waste materials.

The National Society of Professional Engineers has an obligation to speak out on this issue, and to offer constructive suggestions from the perspective of the engineering profession on the implementation and improvement of the hazardous waste laws and regulations.

The primary goals of federal policy should be to minimize the dangers to human health and the environment, both in the short and long term. A national hazardous waste management program should include a realistic assessment of detoxification, recycling, and disposal technologies, and should encourage the utilization of proven and available methods for safely disposing these substances or rendering them harmless.

(This Position Paper was developed by the NSPE Environmental Policy Task Force and was approved by the NSPE Board of Directors at its January 1983 Meeting.)

Introduction

The Executive Committee of the National Society of Professional Engineers, during its semiannual meeting in the summer of 1981, directed the NSPE president to vigorously pursue the development of a position paper on hazardous waste management. President Otto Tennant, P.E., subsequently requested that the Environmental Policy Task Force take responsibility for developing a proposal for consideration by the Executive Committee and the Board of Directors.

The Environmental Policy Task Force strongly agrees with the Executive Committee on NSPE's obligation to speak out on this issue, and recommends that this position paper be adopted as the "NSPE Position on Hazardous Waste Management."

While recognizing the magnitude of the waste disposal problem, the Task Force believes that appropriate, engineered solutions are, or can be made, available which ultimately will provide for the environmentally sound management of hazardous wastes. The Task Force further believes that such solutions can be implemented within a reasonable, phased time period without placing unreasonable burdens on industry, consumers, or taxpayers.

Background

Congress has defined hazardous waste as discarded material that may pose a substantial threat or potential hazard to human health and the environment. Wastes are considered hazardous if they are toxic, reactive, ignitable, or corrosive. These substances, if not properly disposed, can contaminate ground and surface waters, the air, the food chain, and through direct contact adversely affect the health of people and animals.

While radioactive waste is hazardous, Congress has chosen to address that category separately from other hazardous substances. Accordingly, this position paper will only discuss nonradioactive hazardous wastes.

The magnitude of the hazardous waste management problem facing the United States is significant. The U.S. Environmental Protection Agency has estimated that approximately 60 million metric tons (wet) of hazardous wastes were generated by American industry in 1980, and the volume is increasing. In the chemical industry, for example, waste generation is expected to increase by 3.5% annually over the next decade.

The Environmental Protection Agency estimated as recently as 1980 that 90% of hazardous wastes were not "managed" in accordance with federal law. Eighty percent of the wastes have been stored on the generators' property, with 80% of that amount stored in nonsecure pits, ponds, lagoons, or landfills.

There are 760,000 generators of hazardous wastes. Of these, 695,000 are classified as small quantity generators (producing less than 1000 kilograms per month) and are exempted from regulation under current EPA rules.

Legislation and Regulations Concerning Hazardous Waste

The Resource Conservation and Recovery Act of 1976 (RCRA) was enacted "to provide technical and financial assistance for the development of management plans and facilities for the recovery of energy and other resources from discarded materials and for the safe disposal of discarded materials and to regulate the management of hazardous waste."

Under RCRA, Congress declared its intent that solutions to the hazardous waste disposal problem be found through: (1) recovery of the millions of tons of recoverable material resources that are needlessly buried each year; (2) conversion into usable energy of those wastes that are potential energy sources; and (3) promotion of environmentally safe disposal of nonrecoverable residues.

The Environmental Protection Agency has promulgated regulations implementing RCRA periodically beginning in November 1980. Those regulations have addressed most aspects of waste management, with the most controversial being those applicable to owners and operators of hazardous waste treatment, storage, and disposal facilities, and those providing the small generator exemption.

Principles of Hazardous Waste Management

The National Society of Professional Engineers strongly supports the basic goals of the Resource Conservation and Recovery Act. At this time, however, the Society is primarily concerned over three major deficiencies in RCRA's implementation by the Environmental Protection Agency.

First, EPA has designated many substances for inclusion under its hazardous waste regulations which are not hazardous under some circumstances or below certain concentrations. This has resulted in a program which is unnecessarily difficult to administer and imposes needless burdens on industry. This is particularly true with respect to delisting requirements.

Second, while recognizing that properly engineered and monitored land disposal facilities will continue to play a role in our national waste management program, NSPE believes that EPA has not placed enough emphasis on alternative technologies for recycling and disposing hazardous wastes.

Finally, NSPE believes that the current small generator exemption should be modified. Current EPA rules, which exempt generators of less than 1000 kilograms per month, allow significant amounts of dangerous materials to escape regulation.

These three major concerns are discussed in more detail below.

Non-Hazardous Wastes

[illegible] EPA requirements and procedu[illegible]ing treated or detoxified waste mate[illegible] have been listed as hazardous is an inefficient and wasteful bureaucratic exercise. The agency should emphasize development of an efficient process for removing from regulation those substances which can be safely disposed as non-hazardous waste. Specific guidelines for delisting petitions should be published, and properly prepared and submitted petitions should be acted upon within three months.

As a general principle, the degree of risk inherent in any waste should be considered in all regulations concerning its disposal. Controls on hazardous wastes should be initially limited to those which pose a significant risk to the environment or to public health, and regulation of the disposal of waste should be appropriate to the level of risk involved.

Land Disposal

Land burial of hazardous waste will continue to play a role in our national waste management program for the foreseeable future. For a few types of wastes, there simply are no alternatives. For many other substances, recycling and detoxification technologies exist, but facilities are not yet in place.

Nevertheless, EPA should encourage alternatives to land burial for hazardous waste whenever possible and economically feasible.

There is a growing body of evidence that landfills, even those meeting all federal standards and utilizing state-of-the-art technology, cannot be guaranteed against leakage. Such leakage poses a severe threat to our groundwater resources which, once contaminated, are extremely difficult to restore to potable quality.

Furthermore, for many waste types, there are proven engineering procedures for recovery, detoxification, or destruction of hazardous materials. Some wastes are amenable to recycle or reuse in the original process or in other processes. The recovery of solvents by distillation is being practiced widely today. Solvents that are not suitable for recovery may be candidates for incineration, which destroys the waste and, in some cases, provides recoverable heat energy.

Many non-recoverable hazardous wastes can be detoxified by chemical treatment, and the resultant non-hazardous wastes can be safely buried in landfills. Detoxification can also be achieved through stabilization of complex wastes by addition of materials which create a non-hazardous waste that will not leach hazardous substances when exposed in the natural environment.

Waste exchanges which match industrial materials with industrial users of those materials are being organized to serve state and regional markets.

Therefore, as a general statement of principle, NSPE supports a national policy which would disallow land burial for materials that present a significant risk to the environment, and for which economically achievable, environmentally sound alternatives exist. The Environmental Protection Agency should also promote the transfer of recycling and detoxification technology.

To complement EPA's efforts in this regard, the federal and state governments should provide economic incentives to private industry to encourage the installation of on-site treatment facilities and regional waste treatment centers. At such centers, wastes which are not treated at the site of generation could be accumulated, segregated by waste types, and then treated, destroyed, or recovered. Economic incentives the Society recommends for evaluation include tax incentives and revenue bonds, but not outright grants.

NSPE recognizes that a major impediment to treatment centers is related to locating acceptable sites for those facilities. State and federal attention should be directed to expediting the siting of treatment centers.

NSPE also recognizes that landfills that are properly constructed, maintained, and monitored will continue to play a role for the foreseeable future.

Small Generators

The National Society of Professional Engineers believes that the current small quantity generator exemption is too broad. By exempting generators of less than 1000 kilograms per month from regulation, current EPA rules permit the improper disposal of amounts of harmful wastes which cumulatively represent a significant percentage of all hazardous wastes produced.

However, total elimination of the exemption may not be feasible at this time. The U.S. Environmental Protection Agency and its counterparts on the state level simply do not have the resources to regulate all generators.

Therefore, NSPE advocates that EPA restrict exemption for small quantity generators of wastes which pose a significant hazard to human health and the environment.

The Society notes with approval that the development of regional waste treatment centers will encourage small generators to dispose wastes in an environmentally sound manner.

Summary of Recommendations

The National Society of Professional Engineers recommends that state and federal governments create economic incentives for private industry to provide treatment for hazardous wastes and to recover resources from waste materials. Comprehensive regional treatment and recycling facilities should be included under the options eligible for such incentives. Consideration should be given to mechanisms which expedite siting of these facilities.

The Society also recommends the following policies be legislated by Congress and implemented by the U.S. Environmental Protection Agency.

1. Increase emphasis on resource recovery, recycling, and detoxification of hazardous waste materials. Disallow land burial for materials that present a significant risk to the environment, and for which economically achievable, environmentally sound alternatives exist. Encourage the transfer of viable technology for recycling and detoxification of waste.

2. Simplify, streamline, and codify the complex regulations which have been issued to date, to make compliance requirements more understandable to those who generate, treat, or store hazardous wastes. NSPE will provide specific recommendations on a future date.

3. Codify procedures required for delisting petitions for treated wastes, and accelerate review and approval procedures by EPA. Specific guidelines for delisting petitions should be published, and properly prepared and submitted petitions should be acted upon within three months. Encourage delisting action by the states, where appropriate.

4. Restrict exemptions for small quantity generators of wastes which pose a significant hazard to human health and the environment.

5. The degree of risk inherent in any waste should be considered in all regulations concerning its disposal. Further controls on hazardous wastes should be limited to those wastes which pose a significant risk to the environment or to public health, and programs to encourage alternative methods of disposal should be emphasized to focus on those with the highest risk.

Members of the NSPE Environmental Policy Task Force

Edward P. Becker, P.E.
Janis C. Butler, P.E.
John J. McKetta, Jr., P.E.
Stanley M. Wilbur, P.E.
Kermit L. Prime, Jr., P.E., chairman

Mr. GLICKMAN. Thank you very much for an excellent testimony, and I would also like to commend you.

I notice that in the statement of introduction it stated that you served on your national committee when it was largely responsible for the drafting of your national policy statement adopted by your organization on this issue, and I think that you ought to be congratulated. Your statement is an excellent one.

Dr. Berg, are you ready?

STATEMENT OF DR. J. R. BERG, PROFESSOR OF GEOLOGY, WICHITA STATE UNIVERSITY

Mr. BERG. I am if the machine is.

Congressman Glickman and Chairman Scheuer, I am pleased to be here today. My name, as indicated, is J. R. Berg and I am professor of geology at Wichita State University and have been involved with this problem almost from the beginning. In fact, I think the first testimony before the House Environment and Natural Resources Committee in Kansas, of the Kansas Legislature, was on January 31, 1977, at the time that the permit was being applied for, and many of these things that we hear now today were cited to the committee at that time, indicating that they were dangerous and problems, but I think at that time I was like John the Baptist, a voice that went crying in the wilderness, and was not heard.

This merely shows the site where you are going this afternoon. It shows the site in relation to Sedgwick County and Wichita. It is about 12 miles up there to the northeast. It also shows the proximity to Butler County, which is significant later.

The geology of Kansas has often been termed as sort of a layer cake geology by one of our older geologists who has been active in the State. You notice that the layer cake of segments going across the State here in these lines are all reflected on the surface as a bird's-eye view in this map, where the layers go across the State in bands.

Now, this is only a gross and schematic pattern, but there are dozens and dozens of little layers that go across the State, and you can encounter anywhere across the area. And this Wellington layer, which is of some significance, this Wellington shale that goes down into Oklahoma and goes across into Nebraska, and it also goes down below the subsurface, probably Colorado.

The surface of the ground slopes very slightly, although it may seem like at 4,400 feet at Mount Sunflower above sea level, and about 800 feet above sea level. That is a 3,200-foot drop across the State, still it is only a fraction of a degree.

Well, in like manner, the sediments in the subsurface dip a fraction of a degree to the west, so the surface slope of the surface is to the east in general, allowing principal drainage to go to the east except in some places like the Ark River and the subsurface hydrodynamic gradient is largely to the west, but may be altered by other minor changes in the subsurface.

If we look at, a little closer look at the area, this is a bit of an enlarged view showing some of the presence of the Wellington area shale. One can see the town of Furley up here, the town of Greenwich. This is the site area. Some of these layers of gypsum, salt, and numerous thin lentils of limestone.

In a more detailed map, some of the more persistent units may be seen as the Annelly gypsum and the Carlton limestone. There are also numerous lentils of limestone, dolomite, and mudstone which can sometimes be seen in surface exposures, and are also encountered in domestic or stock wells. We have these layers of limestone out at the university. They are coming out of the surface, out underground, which we have to protect the buildings from the water that might seep along them and otherwise seep in the basement of the university buildings. So we have been working with that a long time.

If we look at a still closer view of the area, this is the topography of the Furley site which is very significant, because that 80-acre site probably is, as I indicated early in the game, even before the permit was granted, probably shouldn't ever be sited here because of the topography.

There is a slope from the northwest corner of the section here, southwest corner to the northeast corner of the section of 45 feet drop. That is pretty significant. And likewise, there is a 60-foot drop from the southwest corner of the section down to Prairie Creek, so if the hazardous waste disposal site, just for example, there is a divide ~~area out to the~~ west here a few miles where the drainage, the natural drainage goes to the east, and the Arkansas River drainage goes to the west.

If it had been sited there where it is fairly level, they wouldn't have had some of these problems of seepage and contamination coming out of the sediments and getting on down to the Prairie Creek on either the subsurface or the surface.

Looking at the next illustration, a little more detailed, and this is an older diagram, only includes some of the very early studies from the very earliest study done by, I think, the Standard Engineering and Test Co. They are signficant because in the orginal permit request there was an error on the direction of subsurface flow. It was told from the literature that it was coming to the south and east rather than to the south and largely the west and southwest, and largely there was a request in there for a statement of the other known wells in the area, and the answer on the request was, none known. Well, there were several domestic and stock wells in this area and about 14 dry holes, abandoned oil wells or oil wells in the area.

Here this is, for example, a dry hole up here across the northeast corner of the section, and here is another abandoned oil well here, and here is a dry hole up here. And I have only plotted some of these, but it shows that these wells also may be avenues or areas of fluid access. Every time you drill a hole you disturb nature, and because of corrosion of the casing or improper plugging, which we found in other places in the State, not only can the shale or the soil allow percolation down to the subsurface, but also—along the casing of these wells or any type of hole that is drilled.

In fact, I was a little concerned about the fact that Barbara Sabol said they were going to drill a whole slew of more test holes and unless they are properly drilled and properly cased and properly plugged, just that many more, making it that much more like swiss cheese to provide additional contamination, if they are not properly taken care of or gotten rid of once they no longer serve their use.

Going back to the geological map, the material in this area is known as the Wellington shale, and it is composed of a mineral known as montmorillonite, and the montmorillonite is known as smectite clay. It is a material that expands markedly when it gets wet and damp, and contracts when it is dry. And any of you people who live in the Ark River Valley down here, you don't know about it because you have a sand soil. But if you live up on the hill, either up west of Ridge Road or up on the hill to the east, you know that in dry weather like we are having today, there are cracks and holes and ruts that develop in your land that you can almost step your foot into. If you are trying to water your garden or watering your lawn, you can leave your hose run forever and it keeps going on down, down, down. That happen to you? Never. Well, it has happened to a number of people I talk to.

Even though they cited in the original study that the soil had a permeability of 1 times 10 centimeters to the second magnitude, which would "provide protection to the environment for 251 years, based on a test in Hole 3, or 1,798 years, based on a test in Well 6." Obviously, when these surface soils can crack and break and result in avenues of access, the permeability goes from that very low figure to, if you took a test for those cracks and the porosity, there is 100 percent and the permeability is unlimited. And this was, as I say, pointed out to them before the permit was even granted, and I think this is what is giving them some of the difficulty now.

There were known limestone lentils at depth at that time, but not taken into consideration as being significant.

One thing that I was concerned with at that time, and may not be a problem now, if you look at the Furley waste site here in relation to the proposed Towanda Reservoir, this is the Whitewater River and this blue area was what was proposed at the Towanda Reservoir, and I don't know what Congress is doing with that now, whether they are doing anything with it, but back in 1977 I talked to a resident engineer of the Corps of Engineers at Tulsa who had done an environmental impact study and asked about this. He said that, yes, that would be, and their environmental impact study, if contaminants went down the Prairie Creek and into the Whitewater River system and into the Whitewater River, into the Towanda Reservoir, which was planned partially for a water supply.

One other thing that happened fairly recently that may affect the area, it may not be generally known, but Kansas in general is a fairly safe area with respect to seismic events or earthquakes, but we have got one little area right in this area here, the shaded area, that did have an actual earthquake take place, and one did take place not too long ago, I think it was early February, and the seismic event of about 2.4 magnitude, took place right up here, about halfway between this site and Wichita. Actually, it was about 29th and Andover Road. I have the exact section, township and range, and the latitude and longitude figures in the report.

Now, such seismic events or earthquakes, or seismic events as they are sometimes called, can still result in further fracturing or fissuring or cracking of the soil.

I have a few additional graphs which I am going to show rapidly. Early in the game there was a contention or a contradiction that there wasn't any interconnection between these wells or among the wells, and so what I did, I took some of the EPA data from 1977, December 1977 through January 1980, to see what changes there might be in these wells, looking at pH for individual wells and showing how that it went up markedly and down markedly. Also, I looked at the total alkalinity and the—some of these go up and down markedly, which shows that there probably is some interconnection among the wells and also specific conductants.

Some of these cases are not from the EPA but from the national uranic resources study reports. In order to see that these were not affected by rainfall, I checked with the meteorological records at the Wichita Weather Bureau and they were totally unrelated to rainfall. These high and low points, see, they are based on changes in the wells of these chemical tests that showed some degree of migration and access among the different wells which, as I say, originally had been denied.

My concern in summary, or my final conclusion is that obviously it is difficult to correct some of the original errors or mistakes that were made. To begin with, this thing should never have been sited where it was in the first place, and if there had been adequate consultation or adherence to the advice that was given in even that first hearing, it would not have been sited here, but there ought to have been a considerable commitment to the state, and so they went ahead with it.

There are other areas that are better, but no site is going to be perfect, and it is going to be—being a geologist and one who thinks in not terms of life terms but in terms of hundreds of thousands and even millions of years, we know that nuclear wastes sometimes prevail for hundreds of thousands of years, and they have to be protected for that time. And there is no reason some of these chemicals, once they get into the subsurface, we cannot know where they go specifically, only generally predict or project where they might go to. So I think that when asked a few times before I said clean up the site as good as possible, abandon it and get rid of it and start over, adhering to what we know now in more modern state of the art.

Thank you.

[The prepared statement of Mr. Berg follows:]

PREPARED STATEMENT OF J. ROBERT BERG

My name is J(ohn) Robert Berg, Professor of Geology at Wichita State University. My home address is RR #1, Augusta, Kansas 67010.

The requested purpose of this report is to "address scientific and geological data on the suitability of the Furley site as a hazardous waste landfill."

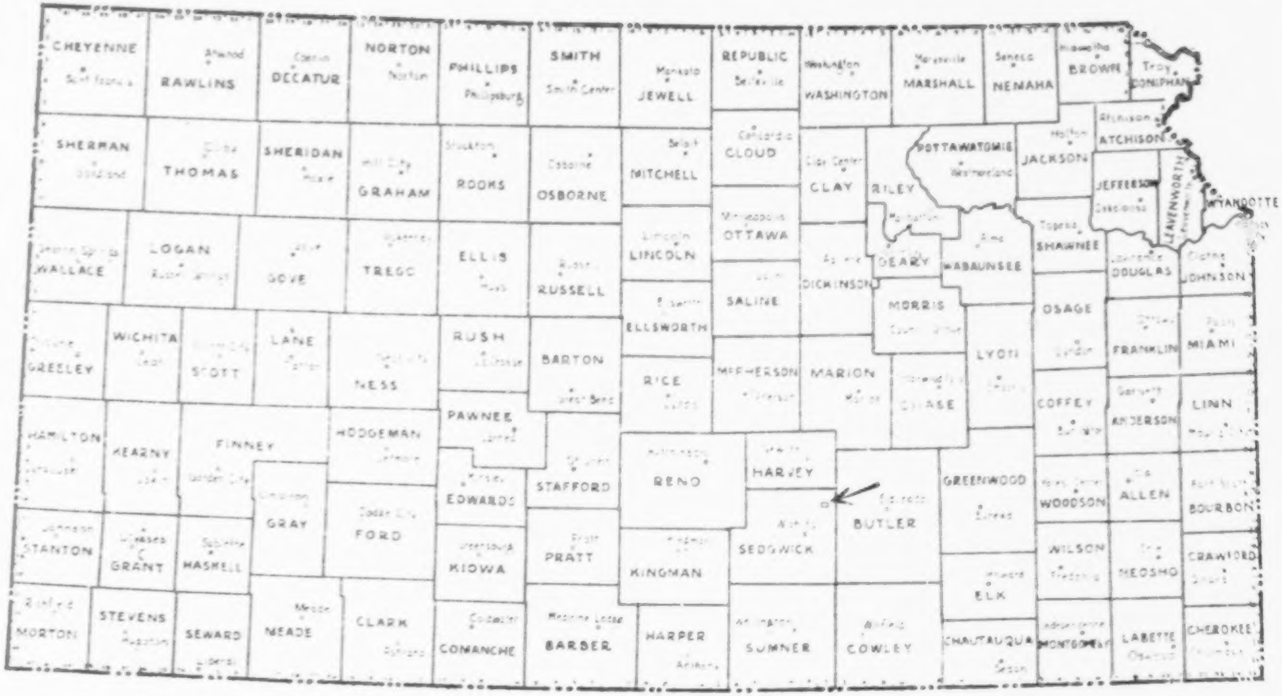
LOCATION

The Furley Waste Disposal is located (Fig. 1) in the northeast corner of Sedgwick County, Kansas, in the N½ SW1/4 Sec. 26, 25S, 2E, about 12 miles northeast of Wichita.

GEOLOGY AND TOPOGRAPHY

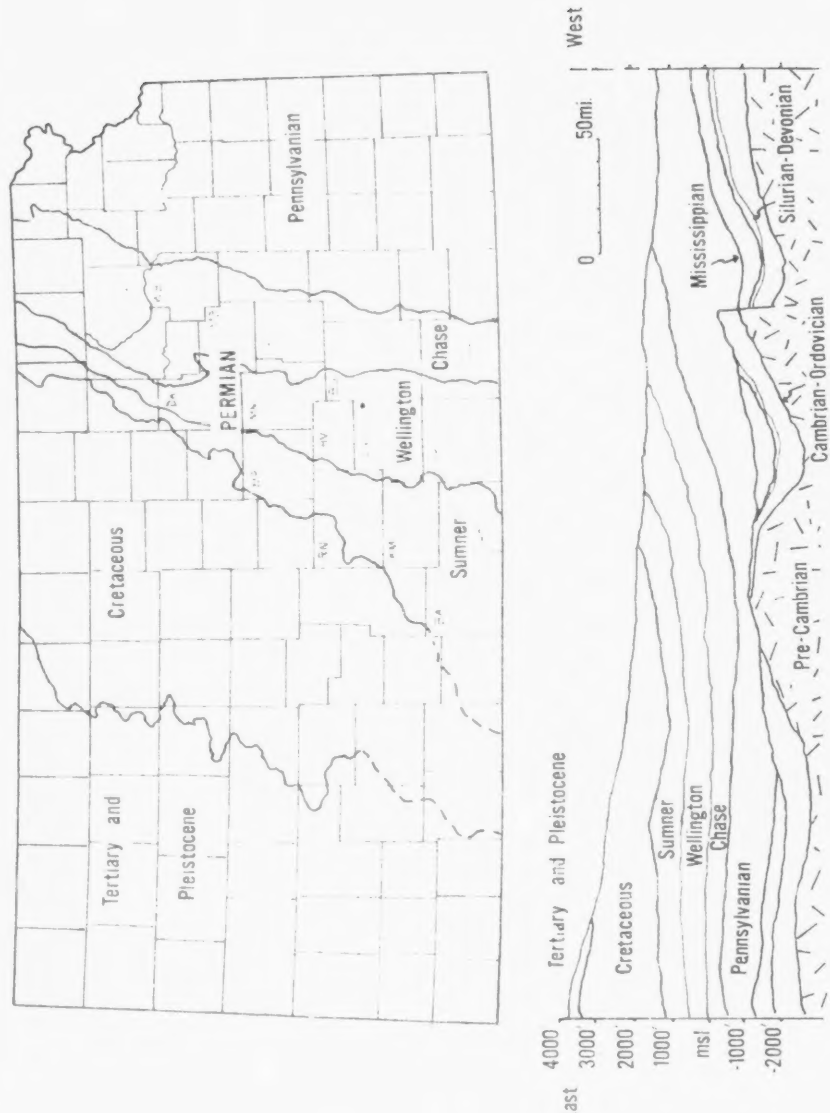
Most of the sedimentary strata of Kansas (Fig. 2) have been described as a "layer-cake" geology because of the inumerable thin strata that can be identified throughout the state, many of which continue north into Nebraska and south into Oklahoma. The slope of the topographic surface is (less than 1^{o}) to the east, and the dip of the subsurface strata are to the west (less than 1^{o}), resulting in bands of outcrops aligned generally north-south across the state. This results in a flow of most surface water and major streams to the east (and south), and the subsurface flow of fluids generally to the west.

Such a north-south alignment is shown in the Wellington formation of


CHEYENNE
RAWLINS
DECATUR
NORTON
PHILLIPS
SMITH
JEWELL
REPUBLIC
WASHINGTON
MARSHALL
NEMAHA
BROWN
DONIPHAN
SHERMAN
THOMAS
SHERIDAN
GRAHAM
ROOKS
OSBORNE
MITCHELL
CLOUD
CLAY
RILEY
POTTAWATOMIE
JACKSON
ATCHISON
JEFFERSON
LEAVENWORTH
WYANDOTTE
WALLACE
LOGAN
GOVE
TREGO
ELLIS
RUSSELL
LINCOLN
OTTAWA
DICKINSON
GEARY
WABAUNSEE
SHAWNEE
DOUGLAS
JOHNSON
GREELEY
WICHITA
SCOTT
LANE
NESS
RUSH
BARTON
ELLSWORTH
SALINE
MORRIS
LYON
OSAGE
FRANKLIN
MIAMI
HAMILTON
KEARNY
FINNEY
HODGEMAN
PAWNEE
STAFFORD
RICE
McPHERSON
MARION
CHASE
COFFEY
ANDERSON
LINN
STANTON
GRANT
HASKELL
GRAY
FORD
EDWARDS
RENO
HARVEY
BUTLER
GREENWOOD
WOODSON
ALLEN
BOURBON
MORTON
STEVENS
SEWARD
MEADE
CLARK
KIOWA
PRATT
KINGMAN
SEDGWICK
ELK
WILSON
NEOSHO
CRAWFORD
COMANCHE
BARBER
HARPER
SUMNER
COWLEY
CHAUTAUQUA
MONTGOMERY
LABETTE
CHEROKEE

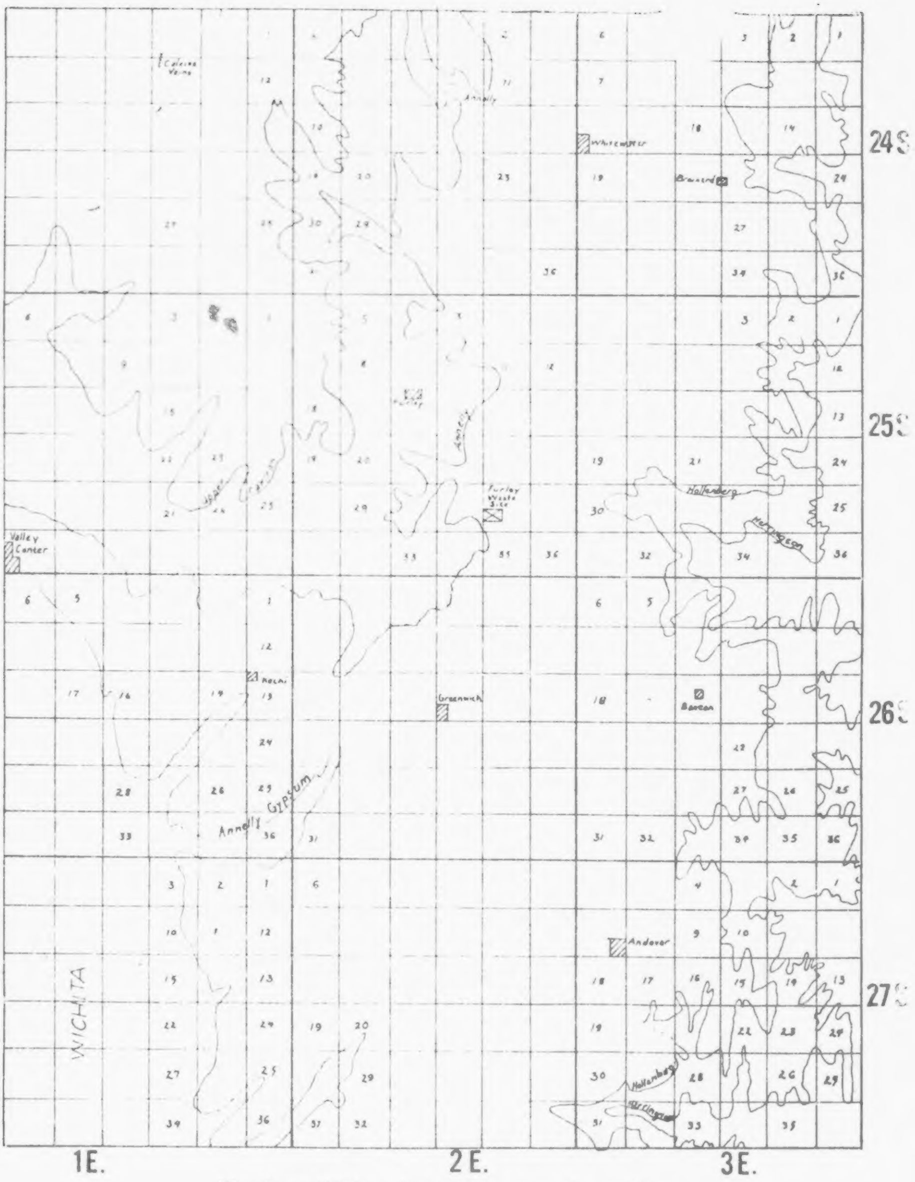
Location of Furley Waste Disposal

fig. 1


Tertiary and
Pleistocene
Cretaceous
PERMIAN
Pennsylvanian
Wellington
Chase
Sumner
East
West
4000
3000
2000
1000
msl
-1000
-2000
0
50mi.
Tertiary and Pleistocene
Cretaceous
Sumner
Wellington
Chase
Pennsylvanian
Pre-Cambrian
Cambrian-Ordovician
Mississippian
Silurian-Devonian

Kansas Map and Cross Section

fig. 2


Calcite Veins
Annelly
Whitewater
Brainerd
Furley
Annelly
Furley Waste Site
Hollenberg
Herington
Upper Wellington
Valley Center
Kechi
Greenwich
Annelly Gypsum
Andover
Hollenberg
Herington
WICHITA
24S
25S
26S
27S
1E.
2E.
3E.

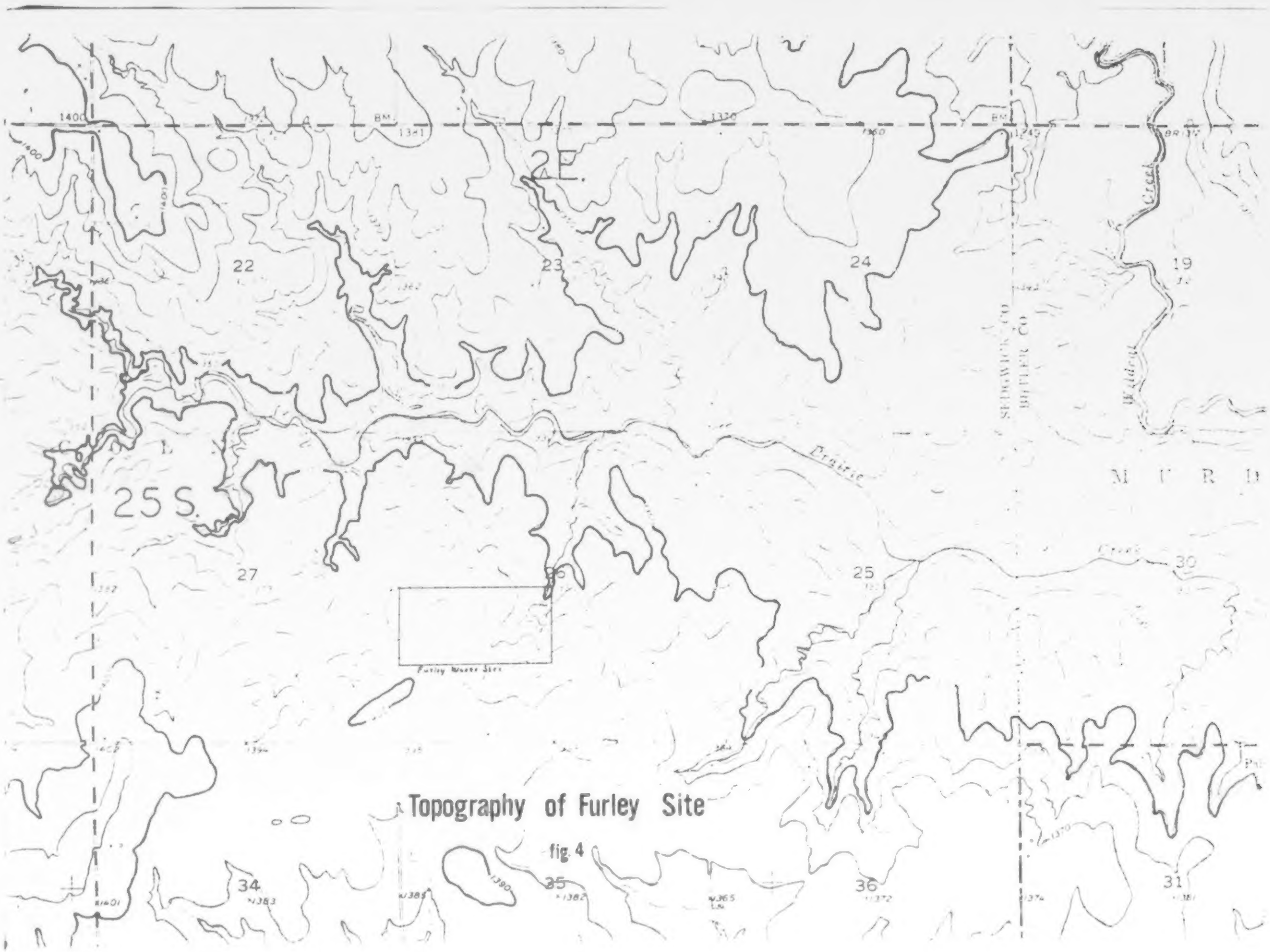
Members Within the Wellington Formation

fig. 3

the Permian Sumner group in which the Furley area is located. The Wellington formation is about 700 feet in thickness composed largely of green shales, but also including layers of gypsum, salt, and numerous thin lentils of limestones. In a more detailed map (Fig. 3), some of the more persistent units may be seen as the Annelly gypsum and Carlton limestone. There are also numerous lentils of limestone, dolomite, and mudstone which can sometimes be seen in surface exposures, and are also encountered in domestic or stock wells. Ice age deposits known as loess are also found on some upland areas, and the soil in the site area is termed the Irwin silty loam.

The topography (Fig. 4) in the site area proper is modified by the presence of Prairie Creek 1/2 mile to the north which results in surface drainage to the north and northeast. The surface slope (Fig. 5) is quite pronounced, approximately 50 feet from the SW corner to the northeast corner of the 80-acre original site. As indicated earlier, the subsurface flow of fluids is largely to the west along the several limestone lentils encountered in the shale. In a report by Lane and Miller* (1963), wells in this township vary from 19 to 90 feet in depth with water levels from 9.5 to 31.1 feet in depth. The closest well to the Furley site in this study is in section 25, 25S 2E, and is 59 feet in depth with a water level of 9.5 feet. In addition to the general subsurface flow to the west, fluids may also seep out as "springs" on the north slope of Prairie Creek immediately north of the site. Prairie Creek is a tributary (Fig. 6) of the Whitewater River, so that such fluids or contaminants can eventually flow into the planned area of the Towanda Reservoir.

In a prior study of the area, the permeability was reported as low as 1.28 x 10.8 cm/sec in well #3 and 1.79 x 10.9 cm/sec in well #6, which would


1400
BM
1341
1370
1360
1345
2E.
22
23
24
19
SEDGWICK CO
BUTLER CO
Wildcat Creek
Prairie
Creek
M U R D
25 S.
27
25
30
Furley Mound Site
1390
34
35
36
31

Topography of Furley Site

fig. 4

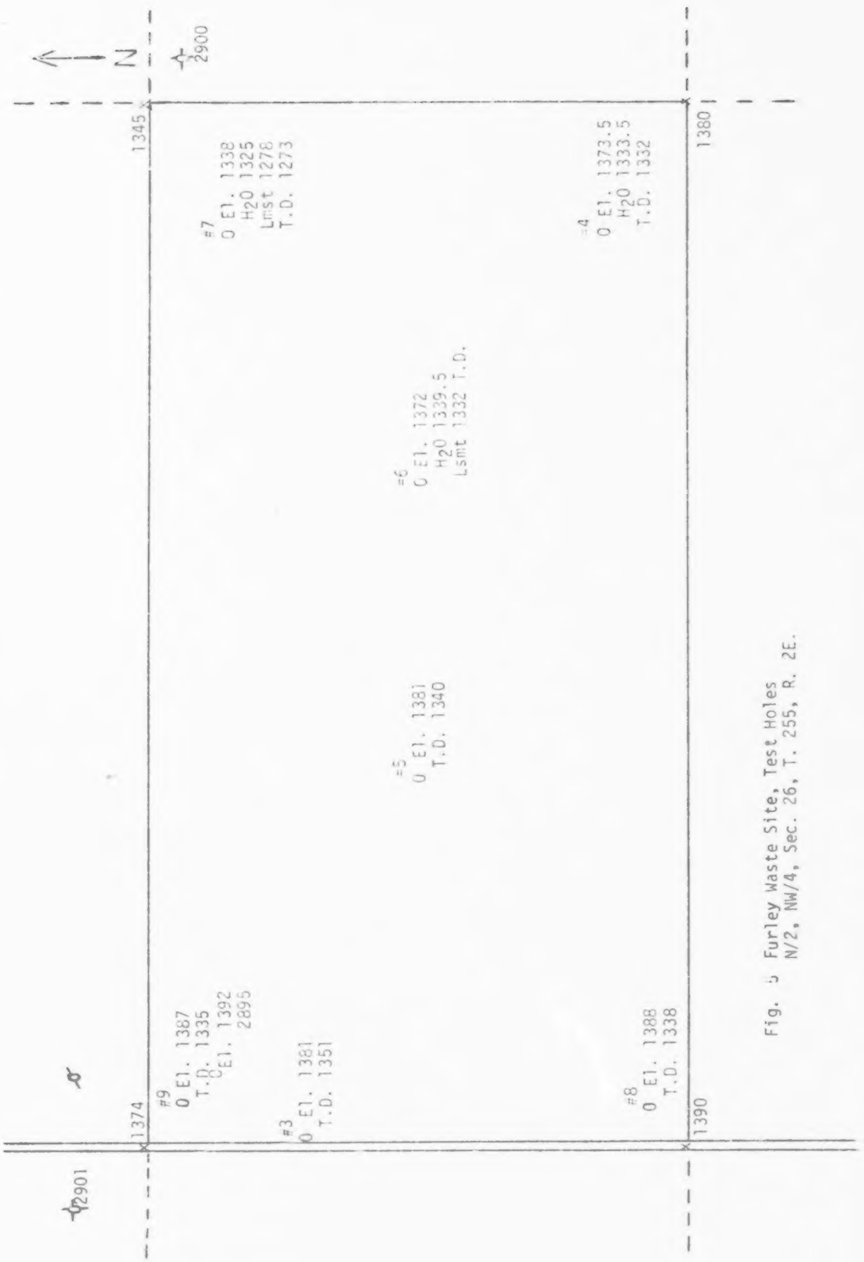

N
2900
1345
#7
O El. 1338
H2O 1325
Lmst 1278
T.D. 1273
1380
#4
O El. 1373.5
H2O 1333.5
T.D. 1332
#6
O El. 1372
H2O 1339.5
Lsmt 1332 T.D.
#5
O El. 1381
T.D. 1340
#9
O El. 1387
T.D. 1335
O El. 1392
2895
#3
O El. 1381
T.D. 1351
1374
#8
O El. 1388
T.D. 1338
1390
2901

Fig. 5 Furley Waste Site, Test Holes
N/2, NW/4, Sec. 26, T. 255, R. 2E.

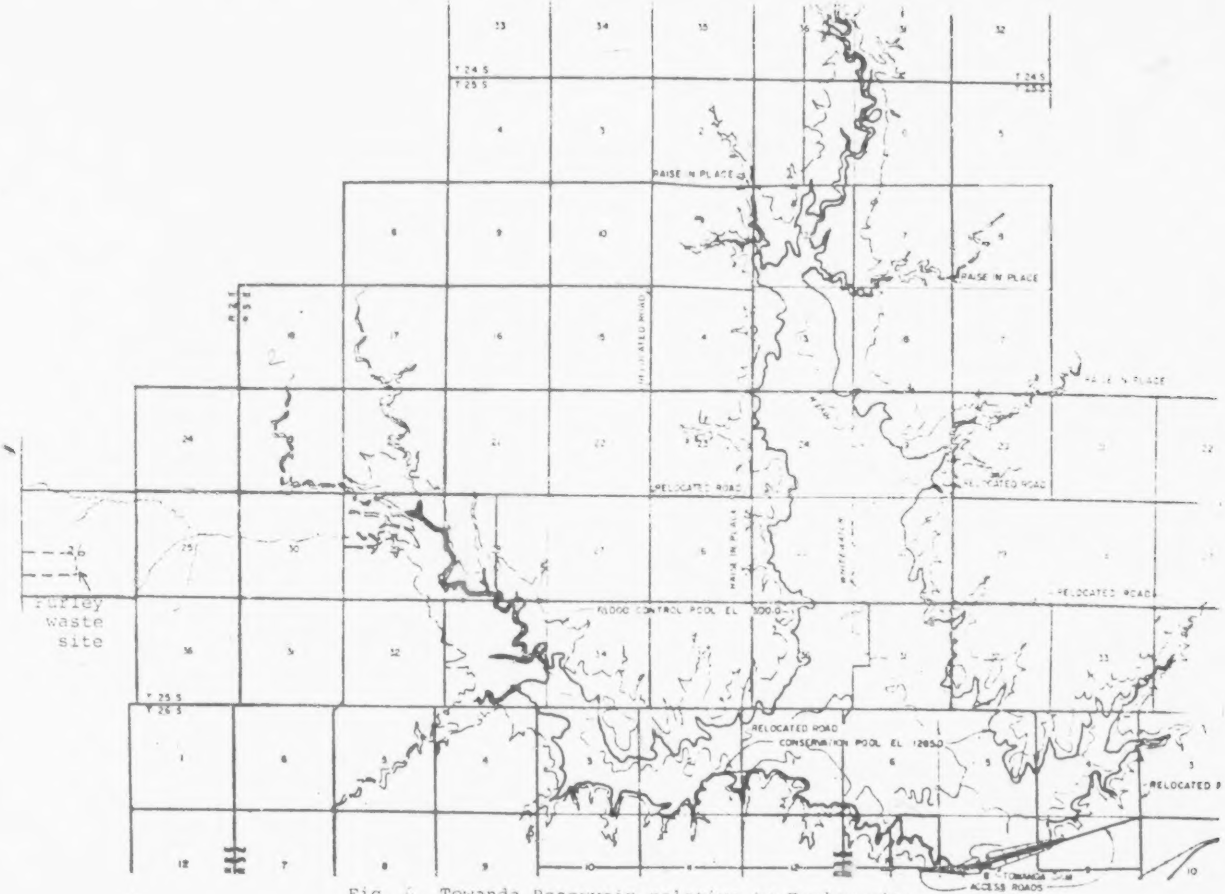

T 24 S
T 25 S
T 26 S
RAISE IN PLACE
RELOCATED ROAD
FLOOD CONTROL POOL EL 1300.0
CONSERVATION POOL EL 1285.0
TOWANDA DAM
ACCESS ROADS
Furley waste site

Fig. 6. Towanda Reservoir relative to Furley site

"provide protection to the environment" for 251 years based on data from test well #3; and for 1,798 years based on data from test well #6. However, the composition of the Wellington formation is largely a montmorillonite, or smectite clay, which contracts markedly when dry, providing avenues of virtually 100% porosity and resulting in extremely high permeability as may be experienced in dry periods. In addition there a 14 dry holes, oil wells, or abandoned wells within a 1/2 mile radius of the site. Any of these wells, if improperly plugged, or subject to later corrosion, could provide access for fluids and contamination to any number of subsurface water zones.

Because there had been some differences of opinion as to permeability and intercommunication among the test wells, a series of graphs were prepared from EPA data to illustrate the flow of fluids between wells.

Data from all test holes were based on determinations made between December 1977 and January 1980. They are in order:

Fig. 7 pH of Furley test holes
Fig. 8 Total alkalinity
Fig. 9 Specific conductance

Based on the variations from well to well versus time, it is obvious that interconnection among the wells is evident. Based upon meteorological data, it was found that these differences were unaffected by rainfall.

In subsequent years following these tests numerous other tests have been made which have revealed contamination from a variety of chemicals disposed at the site.

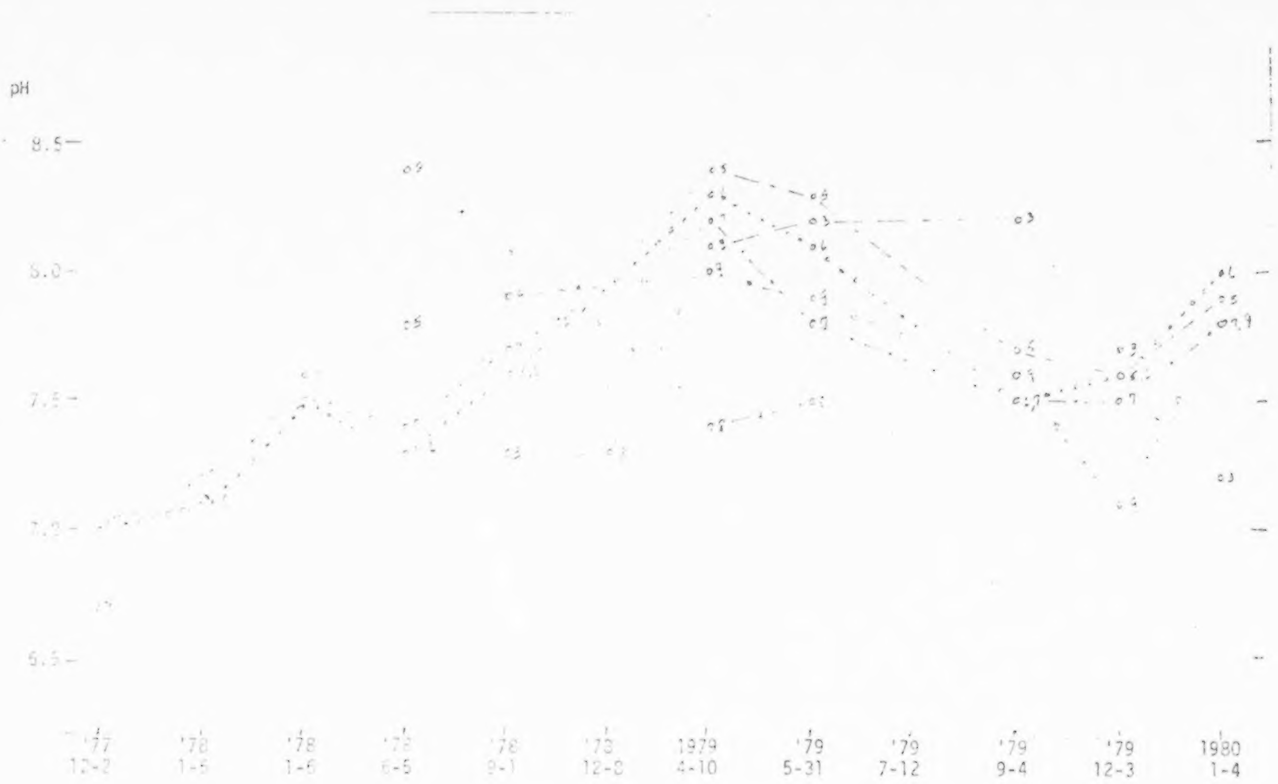


Fig. 7 pH of Furley Test Holes

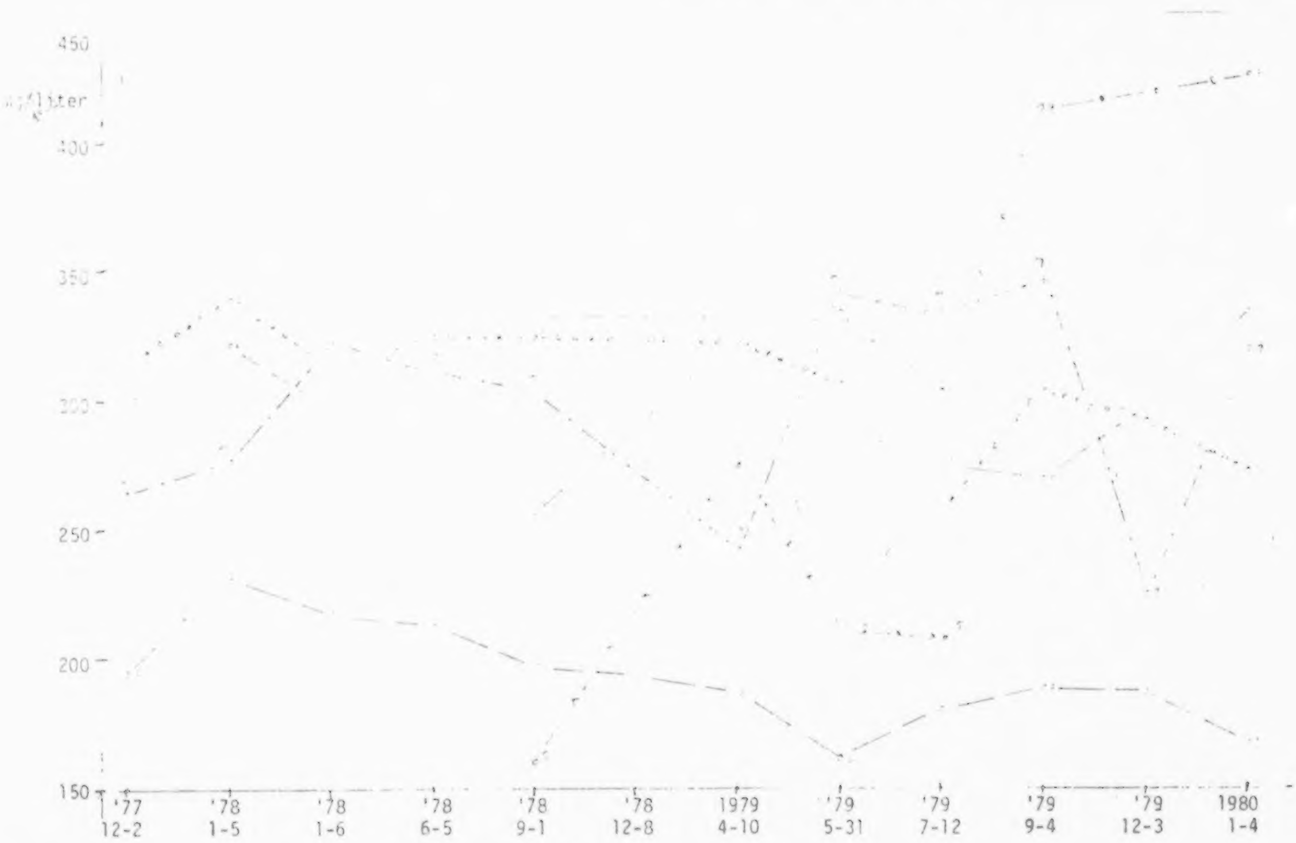


Fig. 8 Total Alkalinity of Furley Test Holes

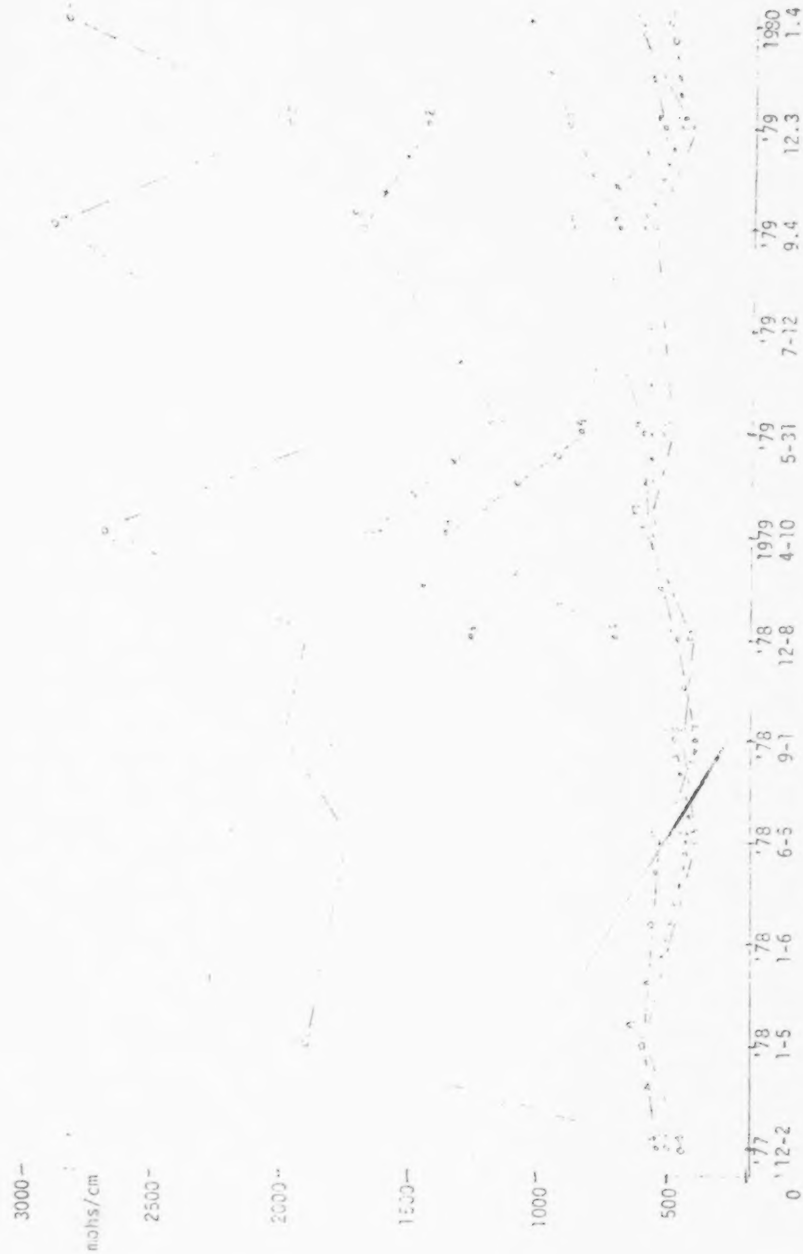


Fig. 9 Specific Conductance of Furley Test Holes

The area is one of #2 in density seismic activity. A seismic event of 2.4 intensity took place early in February, the epicenter of which was in NE-NE-NE Sec. 1, 27S-2E, or 37.776°N and 97.146°W, about 8 miles south of the site.

SUMMARY

The Furley area is not a suitable site for use as a hazardous waste landfill for several reasons:

1. Initial errors in site location and analyses are difficult to impossible to correct.
2. Since there was a period of over five years of contamination from the opening to the closing of the site, it may not be possible to eliminate such contamination in at least that many years.
3. The topography has too much relief, 45 feet from the SW corner of the site to the NE corner of the site, and 60 feet from the SW corner of the site to Prairie Creek.
4. The nature of the Wellington shale and the montmorillonite clay minerals of which it is composed, provide extremely high porosity and permeability during dry periods. In addition, the several limestone layers within the Wellington, result in perched water tables along which fluids can migrate to the west and into Prairie Creek to the north.
5. The several oil wells, dry holes and abandoned wells (14 within a 1/2 mile radius) provide avenues of access for fluids.
6. The area is one of occasional seismic activity which may accentuate the fracturing of the shales.

---

*Lane and Miller, 1965, Geohydrology of Sedgwick County, Kansas, Kansas Geol. Survey Bull. #176.

Mr. GLICKMAN. Thank you for excellent testimony, very useful testimony.

Our final witness today is Mr. Frank Wilson from the University of Kansas, and I realize you are a senior geologist at the Kansas Geological Service. You have already been quoted by our chairman today. It is a pleasure to have you today, and why don't you go ahead?

STATEMENT OF FRANK WILSON, SENIOR GEOLOGIST, KANSAS GEOLOGICAL SURVEY AND ADJUNCT PROFESSOR OF GEOLOGY, UNIVERSITY OF KANSAS

Mr. WILSON. Thank you, Congressman Glickman, for asking me to share with you some of my ideas as to what has gone wrong in the past in the disposal of hazardous wastes and what I hope to see done in the future. As you said, the chairman has already stated my pedigree.

I am sorry that Pete Vardy left because it turns out that Pete Vardy is an old friend of mine that I haven't seen since he went into the waste disposal business, and he would now recognize that I am not an academic. I am a past president of the Society of Engineering Geologists of which—that is where he and I got to know each other.

I would like to make a few brief comments, general comments, and then I will try to answer any of your questions. My knowledge of the situation at the NIES facility is based upon an independent field investigation of a proposed 80-acre expansion, which was done by a team of investigators of the Geological Survey under my supervision in 1980. This investigation was done at the request of the State attorney general when local residents questioned the validity of the site and technical report in support of the application to expand. Their permit was very close to being approved by the secretary of the Department of Health and Environment on the advice of his staff, and then the next sentences say, "Mainly the Deputy Director of the Division of Environment." And Melville Gray called me yesterday and said, "that isn't true. I didn't have anything to do with that until your report came in, and then I was put in charge of the committee to see what to do about it," and he is correct.

Our studies confirm the local people were indeed correct, and that the geotechnical report appeared to have been intentionally falsified.

Mr. GLICKMAN. Excuse me. Repeat what you just said again. I missed that because it is not in your testimony. You stated here that the permit was very close to being approved.

Mr. WILSON. Yes, and then the next sentence says our studies confirmed that the local people were indeed correct, and that the geotechnical report appeared to have been intentionally falsified. Isn't that in yours?

Mr. GLICKMAN. Yes; but I thought you said something about Mr. Gray that was not in the testimony.

Mr. WILSON. Yes; that is not in the testimony. He said he was not involved in the decision to—whether or not to—issue the permit.

Mr. **Glickman**. OK.

Mr. **Wilson**. And he was not called in until our report showed that there was something wrong with the geoengineering report, and then he was put in charge of a committee to look into that.

Mr. **Glickman**. OK, go ahead.

Mr. **Wilson**. Others have testified in detail as to what went wrong here. I will briefly summarize my opinion. First, I don't know what, if any, criteria guided the choosing of the facility site. I doubt there were any except the availability of the land.

Second, the site geotechnical report stated that, and in my written testimony it says 90 feet and that was thought at one time, but going back to the original report, approximately 45 feet of nearly impermeable clay occurred below the site and that there was no ground water at that depth. This report was taken at face value even though the district geologist, who has many years experience, that is the district geologist for KDHE, should have known that brittle, fractured shale is plowed up in the fields adjacent to the site and there are shallow wells on all the nearby farmsteads.

Third, no inspection was made during construction of the facility. It is now known that the so-called evaporation ponds were cut down below the level of the upper water bearing zone. Now this is not in my testimony, I think that was done intentionally because the geotechnical consultant knew that those permeable zones were there and that that would take care of the liquids much faster than waiting for evaporation to do it. It may be of interest to note that the geotechnical consultant, who prepared the report for the facility, became its first manager.

Mr. **Glickman**. Who was that?

Mr. **Wilson**. Lee Deets.

Mr. **Glickman**. And is he no longer with the company?

Mr. **Wilson**. No. He is, I think, a consulting engineer in Texas. I am not sure.

Mr. **Glickman**. How do you spell his last name?

Mr. **Wilson**. D-E-E-T-S.

Mr. **Glickman**. OK.

Mr. **Wilson**. In short, certain officials of KDHE rammed through official approval of the permit without proper review of application documents and over the objections of the local residents who turned out to be correct.

Their subsequent actions are the same, when the Geological Survey's investigation of the proposed expansion showed that the consultant's geotechnical report was flawed they refused to accept it until NIES' own consultant confirmed it.

They have been slow to react to signs that there were problems at the site and once found, slow in reaching decisions as to how to solve them. For example, I was on that committee reviewing the Woodward-Clyde investigation of the proposed site and it was at that time, or shortly after at one of the meetings, it was announced that leachates were migrating offsite to the north. I thought about that overnight and the next morning I wrote a letter to the then-secretary of health and environment and suggested that immediately a backhoe trench should be dug down to the layer or the little aquifer that was leaking, and should be carried, and if found water, then it should be carried east until no water was found. The bottom of the trench should be sloped to a sump, perforated pipe installed, and the trench backfilled with some type of, not a limestone but a sand backfill that would effectively, immediately have cut off any further leachate migration offsite, and then they could have looked in more detail and in taking the time to decide how they wanted to correct that.

I didn't hear from the secretary of health and environment for several weeks. He said that the consultant had suggested that previously, and then they said no, we would rather study it. So they spent 6 months, 75 holes, a quarter of a million dollars, to come up with the same suggestion that I proposed, except that trench doesn't go clear across the north side of the site.

And I think it is not effectively cutting off everything that is moving on that—that is not in my testimony—even now, or they were resisting requests to test for contaminant that may be moving offsite in directions other than to the north.

Secretary Sabol has reported to you that she has directed that that be done. I will show you evidence later on indicating that it is moving offsite to the northeast, at any rate.

What went wrong here? First, the site was located by a couple of local entrepreneurs without regard to its suitability. Second, the State regulatory agency didn't properly review the site application.

What can be done? I think the site, if it is found as I think it will be, that contaminants are moving offsite, should be surrounded by a dragline dug interception trench, and perhaps other trenches at hot areas inside the facility boundaries. These should be pumped until contaminant levels are considerably reduced. It may take a good time and you could probably drain that 80 acres fairly quickly. Anything that might be disseminated in the shales will take a long time to get out, likely. The liquids and all the treatment and evaporation ponds should be immediately removed and disposed of in a licensed, deep disposal well that WMI owns in Oklahoma or elsewhere.

Once the site is cleaned up to the satisfaction of EPA and KDHE, it should be closed. And the Secretary mentioned this survey that was done by Michael Ginzberg. The reason I think it should be closed is that no effort will be made to find a suitable site if the facility is allowed to be opened, and I think there are suitable sites in Kansas.

I will tell you a little anecdote that would make this a little too long, but I went out just about 1 year ago with a representative from Chem Securities, Inc., which is a wholly owned subsidiary of Chem Nuclear, Inc. They are a very reputable company. Their motto was, "Thrive on regulation."

They have a state-of-the-art site in Oregon and they have been very successful up until that time in getting permits. What they do is, they take the mayor, city commission, and the other interested people near their sites out to that place in Oregon and show how it is operated, and they just haven't had any problems.

I went out with him and I showed him several places in eastern Kansas which I thought were suitable for the disposal of hazardous wastes. He was so impressed that he went into Kansas City and got a land man to go out to check the values the next day.

Well, I had learned shortly before that that a law firm in the Washington, D.C., area, they said send me everything you know about Furley. I said why, and they said Waste Management, Inc., is trying to take them over and they don't want to be taken over by Waste Management, Inc.

After I got back—it was on a Wednesday that I went out in the field. On Thursday, in the Wall Street Journal it was that they had been bought by WMI. Here was a firm that was reputable and ran a state-of-the-art waste facility in Kansas, but we won't have that now.

If we have to have these facilities, and I agree we probably will, then I very much prefer a concept advanced recently by Prof. K. R. Brown and his colleagues at Texas A&M University. He proposes that rather than lined disposal pits, that the waste be placed at ground level over a gently sloped surface, under which a compacted clay layer membrane and another clay liner is constructed. Under each cell a horizontal layer of gravel and collector pipe is installed. The drains are sloped to drain by gravity into a storage tank. Earth is then mounded up around and over the cells. Upon closure of the site, an artificial membrane cap and sufficient layer of earth to provide a vegetative cover is placed on top.

Another advantage you might not think of is that a physical mound remains, whereas with a pit, many generations later its presence may be forgotten, and you build a park over it maybe.

The other advantages of this method are the precipitation is shed rapidly off the mounds and if the cells should leak, which is unlikely, the leachate will be collected automatically.

What about the future? Even if the amount of generated waste is reduced, it is likely that some sort of waste treatment facilities will still be necessary. I like the concept set forth by an official of Browning-Ferris Industries, Inc., at a conference that I attended a couple of years ago. He predicts that after the small, Furley-type dumps are gotten out of the business, either by environmental, financial, or regulatory problems, that responsible firms will establish a few large regional facilities on environmentally suitable sites of several square miles in area.

These facilities would be able to charge fees that would allow them to chemically and biologically break down the concentrated wastes, incinerate, recycle, et cetera, and only bury or store at last resort.

These sites could also be used for the disposal of low-level radioactive wastes, a problem that is becoming increasingly acute.

How may these sites be acquired considering the likely public opposition?

Pickett Simpson, who is the deputy diretor of the New York State Environmental Facilities Corp., a State agency, has suggested an interesting approach. I understand, unfortunately, that his plant was not approved, but that it is being tried, I believe, in Arizona.

He suggests that an independent State authority be established in the same manner as, say, the turnpike authority in Kansas. Using seed money from State funds, the authority would do investigations to find a suitable site, acquire the land, by exercising powers of imminent domain if necessary, hold public hearings, actually they would hold the public hearings before acquiring the land, and to do everything necessary to get a permit to operate from the State or Federal regulatory agencies.

With permit in hand, the authority would then advertise for bids from private industry for construction and operation of the facility to the authority's specifications. It would also monitor the operation of the facility.

Seed funds would be reimbursed from a negotiated percent of the annual net profits earned by the facility and any excess put in escrow to close and monitor the site. Before that time, sufficient funds should be available to redo the process without public funding.

Thank you again for asking me to talk to you.

[The prepared statement of Mr. Wilson follows:]

TESTIMONY OF FRANK W. WILSON BEFORE THE U.S. HOUSE OF REPRESENTATIVES COMMITTEE ON SCIENCE AND TECHNOLOGY - WICHITA, KANSAS, AUGUST 1, 1983

Members of the Committee, thank you for asking me to share with you some of my ideas as to what has gone wrong in the past in the disposal of hazardous wastes and what I hope to see done right in the future.

I am Frank W. Wilson, a senior geologist with the Kansas Geological Survey and an adjunct professor of Geology at the University of Kansas. My specialty is engineering geology and I have a little more than 30 years of experience in the field. My vita is attached if you are interested in a detailed description of my qualifications.

My knowledge of the situation at the NEIS facility is based upon an independent field investigation of a proposed 80 acre expansion which was done by a team of investigators of the geological survey under my supervision in 1980. This investigation was done at the request of the State Attorney General when local residents questioned the validity of the site geotechnical report in support of the application to expand. The permit was very close to being approved by the then Secretary of the Department of Health and Environment on advice of his staff, mainly the Deputy Director of the Division of Environment. Our studies confirmed that the local people were indeed correct, and that the geotechnical report appeared to have been intentionally falsified.

Others I hope will testify on detail as to what went wrong here. I will briefly summarize my opinion. First, I don't know what, if any criteria guided the choosing of the facility site. I doubt there were any except the availability of the land.

Second, the site geotechnical report stated that 90 feet of nearly impermeable "clay" occurred below the site and that there was no groundwater to that depth. This report was taken at face value even though the District Geologist who has many years of experience should have known that brittle, fractured shale is plowed up in fields adjacent to the site and there are shallow wells on all the nearby farmsteads.

Third, no inspection was made during construction of the facility. It is now known that the so-called evaporation ponds were cut down below the level of the upper water-bearing zone. It may be of interest to note that the geotechnical consultant who prepared the report for the facility became its first manager.

In short, certain officials of KDHE rammed through approval of the permit without proper review of application documents and over the objections of local residents who turned out to be correct.

Their subsequent actions are the same, when the Geological Survey's investigation of the proposed expansion showed that the consultant's geotechnical report was flawed, they refused to accept it until NEIS's own consultant confirmed it.

They have been slow to react to signs that there were problems at the site and once found, slow in reaching decisions as to how to solve them.

Even now, they are resisting requests to test for contaminants that may be moving off site in directions other than north.

What went wrong here? First the site was located by a couple of local entrepren~~cier~~eurs without regard to its suitability. Second, the state regulatory agency didn't do its duty.

What can be done? I think the site should be cleaned up by surrounding it with drag-line dug interception trench and perhaps other trenches at hot areas inside the facility boundaries. These should be pumped until contaminant levels are considerably reduced. The liquids in all of the treatment and evaporation ponds should be immediately removed and disposed of in a licensed deep disposal well that WMI owns in Oklahoma or elsewhere.

Once the site is cleaned up to the satisfaction of EPA and KDHE, it should be closed. A recent survey done by Michael Ginsburg of the Wichita Eagle-Beacon showed that many of the large firms such as Cessna Aircraft Company have modified their procedures to reduce waste production and will not use the facility if it were to reopen. No effort will be made to find a suitable site if the facility is allowed to reopen.

WMI will argue that they have constructed a membrane-lined pit and that the geology is no longer a factor. I do not agree. We have very little experience with these membrane liners in contact with the great variety of chemical compounds that they will contain. If they leak, there is no way of knowing where the leak is.

If they do not leak for thirty years after closure of the site, the firm's bond is returned and responsibility returns to the state. Monitoring will likely stop and if leakage occurs a hundred years from now it probably won't be detected until it shows up in somebody's well.

If we have to have these facilities, and I agree we probably will, then I very much prefer a concept advanced recently by Professor K.R. Brown and his colleague at Texas A&M University. He proposes that rather than lined disposal pits, that the waste be placed at ground level over a gently sloped surface under which a compacted clay layer, membrane and another clay liner is constructed. Under each cell, a horizontal layer of gravel and collector pipes is installed. The drains are sloped to drain by gravity into a storage tank.

Earth is then mounded up around and over the cells. Upon closure of the site an artificial membrane cap and sufficient layer of earth to provide a vegetative cover is placed on top.

Another advantage you might not think of is that a physical mound remains, whereas with a pit many generations later its presence may be forgotten.

The advantages of this method are that precipitation is shed rapidly off the mounds and if the cells should leak, which is unlikely, the leachate will be collected automatically.

What about the future? Even if the amount of generated waste is reduced, it is likely that some sort of waste treatment facilities will still be necessary. I like the concept set forward by an official of Browning-Ferris Industries, Inc. at a conference that I attended a couple of years ago. He predicts that after the small, Furley-type dumps are gotten out of the business either by environmental, financial or regulatory problems, that ~~large~~ responsible firms will establish a few large regional facilities on environmentally suitable sites of several square miles in area. These facilities would be able to charge fees that would allow them to chemically and biologically break down the concentrated wastes, incinerate, recycle, etc. and only bury or store at last resort.

These sites could also be used for the disposal of low-level radioactive wastes, a problem that is [illegible] becoming increasingly acute.

How may these sites be acquired considering the likely public opposition?

Pickett Simpson who is the Deputy Director of the New York State Environmental Facilities Corporation, a state agency, has suggested an interesting approach. I understand, unfortunately, that his plan was not approved, but that it is being tried, I believe, in Arizona.

He suggests that an independent state authority be established, in the same manner as, say the Turnpike Authority in Kansas.

Using seed money from state funds, the authority would do investigations to find a suitable site or sites, get options on the land, hold public hearings and do whatever else might be necessary to get a permit to operate from the state or Federal Regulatory agencies.

With permit in hand, the authority would then advertise for bids from private industry for construction and operation of the facility to the authority's specifications. It would also monitor the operation of the facility.

Seed funds would be reimbursed from a negotiated percent of the annual net profits earned by the facility and any excess put in escrow to close and monitor the site. Before that time, sufficient funds should be available to redo the process without public funding.

Thank you again for asking me to talk to you.

LANDFILLS OF THE FUTURE: ABOVEGROUND AND ABOVEBOARD

(Draft: April, 1983)

Aboveground landfills, when constructed over sloped double liners, offer several advantages over below ground facilities. Continuous gravitational leachate removal would greatly reduce the potential for groundwater pollution. Aboveground leachate collection systems would be accessible and repairable. A discussion of advantages and disadvantages of both above and below ground landfills follows.

K. W. Brown and David C. Anderson
K. W. Brown and Associates, Inc.
707 Texas Avenue South, Suite 202D
College Station, Texas 77840

Landfills have come a long way from the days of open dumping and ravine-filling. New hazardous waste landfills are required to have leachate collection systems, liners, and caps. If properly constructed and maintained, these measures should substantially reduce the short-term quantity of leachate that escapes from a landfill. Liners, leachate collection systems, and caps on below ground landfills may, however, cease to function properly sometime within the first few decades after closure of the landfill. There is now no requirement for leachate collection following the 30-yr. closure period. Yet, many wastes are likely to remain hazardous for centuries.

A failed liner or leachate collection system may not be detected and, if detected, may be impossible to repair without taking drastic measures such as waste excavation. Many of these problems could be avoided by constructing future landfills above ground and on a sloped, double lined base (Figure 1A). The expense of building a sloped-base could be avoided by constructing a "hillfill" using gently sloping hills as the landfill base. Much of the technology already developed for existing landfills, including double liners, leachate collection systems, waste stabilization, and caps could be readily adapted to aboveground landfills.

Leachate Collection Systems

Below ground landfills do not have leachate collection systems designed for continuous leachate removal. Most of these systems cannot remove leachate until the collection pipes are submerged in leachate. Consequently, below ground landfills may well have at least shallow pools of leachate standing on their liners at all times. Futhermore, no provisions are currently being made for monitoring or removing leachate after the sites are completely closed. Thus, leachate will likely accumulate over time. If a leachate collection system fails due to clogging or collapse of the collection pipes, it would be extremely difficult to repair.

An aboveground landfill may be constructed with a continuously operating leachate collection system. By simply incorporating a slope in the base of an aboveground landfill, leachate would be continuously removed by gravity. Since all leachate collection pipes would be above ground level, they would be accessible, in the event that repairs are needed, and serviceable for centuries. The system would also be relatively inexpensive because no pumps or labor would be required for leachate removal.

With both a drainage layer and collection pipes constructed over the sloped liner (Figure 1A), leachate would continue to be removed by gravity even if the collection pipes collapsed. Consequently, there would be

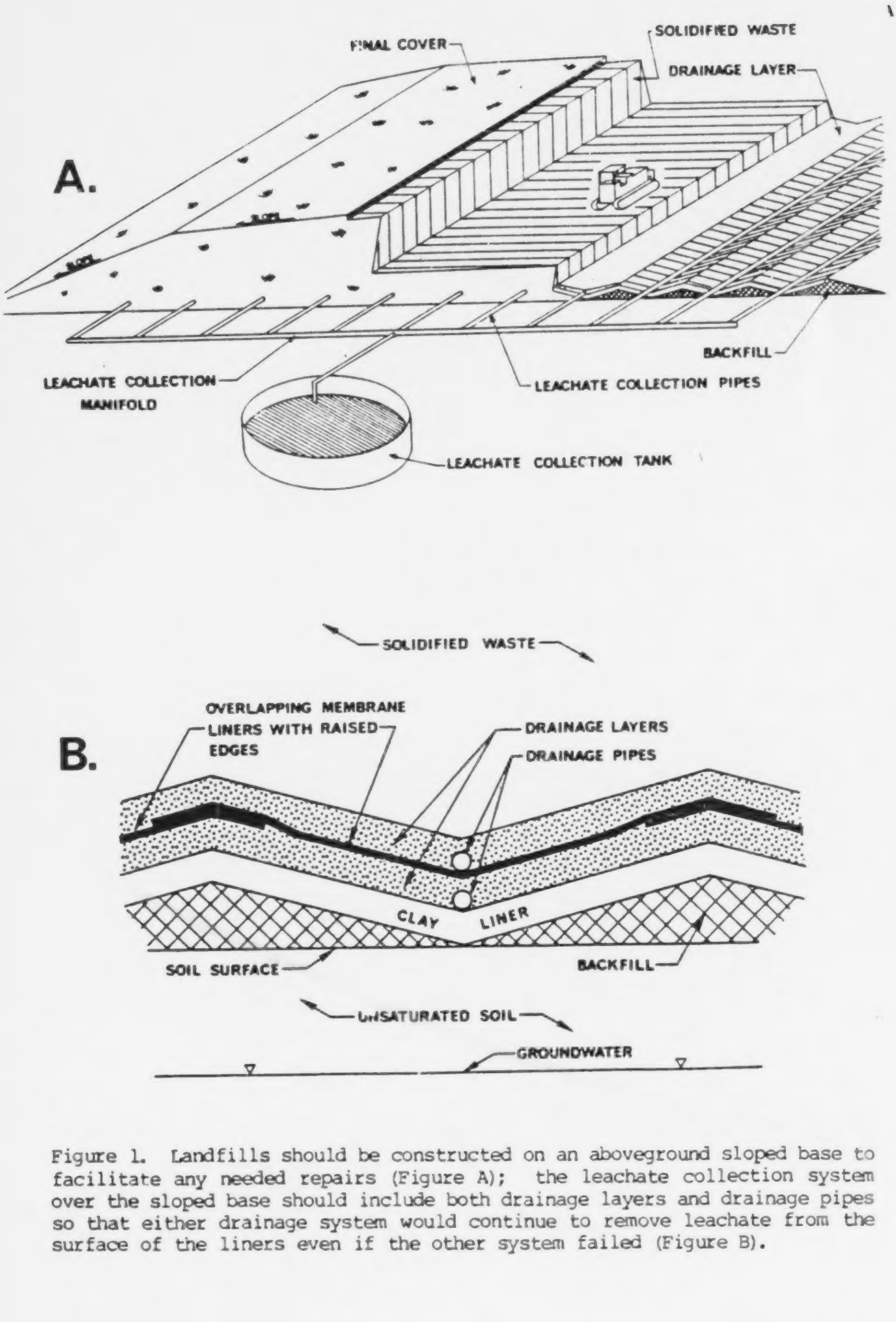

A.
FINAL COVER
SOLIDIFIED WASTE
DRAINAGE LAYER
SLOPE
SLOPE
BACKFILL
LEACHATE COLLECTION MANIFOLD
LEACHATE COLLECTION PIPES
LEACHATE COLLECTION TANK
SOLIDIFIED WASTE
B.
OVERLAPPING MEMBRANE LINERS WITH RAISED EDGES
DRAINAGE LAYERS
DRAINAGE PIPES
CLAY LINER
SOIL SURFACE
BACKFILL
UNSATURATED SOIL
GROUNDWATER

Figure 1. Landfills should be constructed on an aboveground sloped base to facilitate any needed repairs (Figure A); the leachate collection system over the sloped base should include both drainage layers and drainage pipes so that either drainage system would continue to remove leachate from the surface of the liners even if the other system failed (Figure B).

little opportunity for other problems to occur, such as seepage through either the liner or sidewalls.

Liners and Caps

Flexible membranes and clay are the two main materials used to construct low permeability landfill liners. Clay liners may be rendered significantly more permeable by exposure to concentrated leachates that hazardous waste may initially release. While flexible membrane liners may have initial low permeabilities, their 10-30 year useful lifetime covers only a fraction of the period during which a landfill may generate contaminated leachate. Any hazardous waste disposal facility would be better off with a double liner system, and the best double liner would be a combination of a flexible membrane upper liner with an underlying clay liner (Figure1B). Compatibility tests may be used to select the best membrane material for containing particular waste leachates.

A properly installed and tested membrane liner should last at least 10 years if the need to rely on the seams could be eliminated. This would be possible if flexible membrane liners were constructed on a sloped, sawtoothed base as shown in Figure 1B. Because leachate would be continuously removed by gravity, the liquid level should never reach the overlapped membrane edges. By the time the membrane deteriorated, the concentration of salts, acids, bases, and organics should have decreased substantially.

Clay minerals, with their proven ability to last thousands of years, may be a better liner material for minimizing the long-term leakage of weak leachates. With an overlying membrane liner, the clay liner would be protected from the strong initial leachate that might otherwise increase liner permeability.

With continuous removal of leachate, liners in aboveground landfills should have less exposure to leachate and should, therefore, leak much less and last much longer than similar liner configurations in below ground landfills. Consequently, there would be less dependence on site geology for containment of the waste and a lower potential for groundwater contamination. These and other advantages of landfilling waste using an aboveground sloped liner are listed in Table 1.

Table 1. Advantages of Landfilling Waste on an Aboveground Sloped Liner

No head of liquid would collect on the liner due to continuous gravitational drainage. Consequently:

(1) potential for groundwater contamination would be minimized;
(2) dependence on site geology for waste containment would be lessened;
(3) potential would be reduced for liner deterioration from contact with leachate.

A leachate collection system constructed over the aboveground sloped base and consisting of drainage layers and perforated collection pipes would provide for the following:

(1) leachate collection pipes would be accessible for clean-out should they become clogged;
(2) continuous gravitational removal of leachate would continue through the drainage layer even if the collection pipes completely collapsed;
(3) any increase in the volume of leachate produced would be an immediate indication of the need for cap repair;
(4) long after closure, if leachate were released, it would be readily observable rather than move undetected into groundwater.

Both above and below ground landfills may be equipped with low permeability caps. While caps reduce leachate generation resulting from infiltration of water, these caps may shear or crack due to settlement of the landfilled waste. Compared to leaking liners, cracked caps may be relatively easy to repair. However, cap deterioration may not be readily apparent through visual inspection once the landfill is covered with topsoil and permanent vegetation. Cap failure may only be detected through increase in leachate production. Such an increase in leachate volume may go unnoticed in a below ground facility until the groundwater was polluted. However, it would be readily evident as an increased leachate discharge rate in an aboveground landfill.

Advantages and Disadvantages of Aboveground Landfills

Continuous leachate removal and the resultant increased effectiveness of liners in aboveground landfills may greatly reduce the potential for both groundwater pollution and long-term liability. Since aboveground facilities would be further removed from groundwater, siting requirements would be less severe than those for below ground facilities. With gases generated above the ground surface, the possibility of subsurface migration to adjacent areas would be virtually eliminated. Advantageous options that could be incorporated into aboveground landfills include the following:

1) above the leachate collection system, layers of materials such as crushed limestone and activated charcoal could be placed to remove heavy metals and organics, respectively;

2) before placement of the low permeability cap, leachate could be recirculated through the landfill cells to both hasten digestion of readily degradable organics and leach the highly mobile waste constituents prior to the post-closure period.

There are a variety of other advantages to keeping waste above ground. For instance, no one would ever forget the location of the disposal site. In addition, if the waste became valuable someday, it could easily be mined. The uncapped landfill surface could be used as an intensive land treatment unit.

Disadvantages of aboveground landfills include the potential for poor site aesthetics and the need for erosion control. However, with proper design and use of vegetation, both problems could be overcome. Site aesthetics of aboveground facilities may be improved by maintaining a permanent vegetative cover over the facility. Additional improvements in site aesthetics could be obtained by planting trees and small woody species around the periphery and along adjacent roadways. Erosion could be minimized by a permanent vegetative cover and a site design that minimized steepness and total area of side slopes. Using adjacent landfill cells would decrease the total area of slopes, while a small amount of earth-fill could sufficiently reduce the steepness of exposed sidewalls.

Advantages and Disadvantages of Below Ground Landfills

The main advantage of below ground landfills is that these facilities are out-of-sight and hence out-of-mind. The main disadvantage is that these facilities eventually get out-of-control. One technique used to site below ground landfills in humid climates is to artificially lower the groundwater table by continuously pumping out leachate (Figure2A). This technique is supposed to force liquids to flow into the landfill, thereby preventing contamination of groundwater or deterioration of the liner due to exposure to leachate. The main problem with this design is the unrealistic requirement for perpetual pumping.

State-of-the-art below ground landfills minimize groundwater contamination by pumping out leachate and maintaining a low permeability cap (Figure 2B). While these measures should prevent widespread groundwater

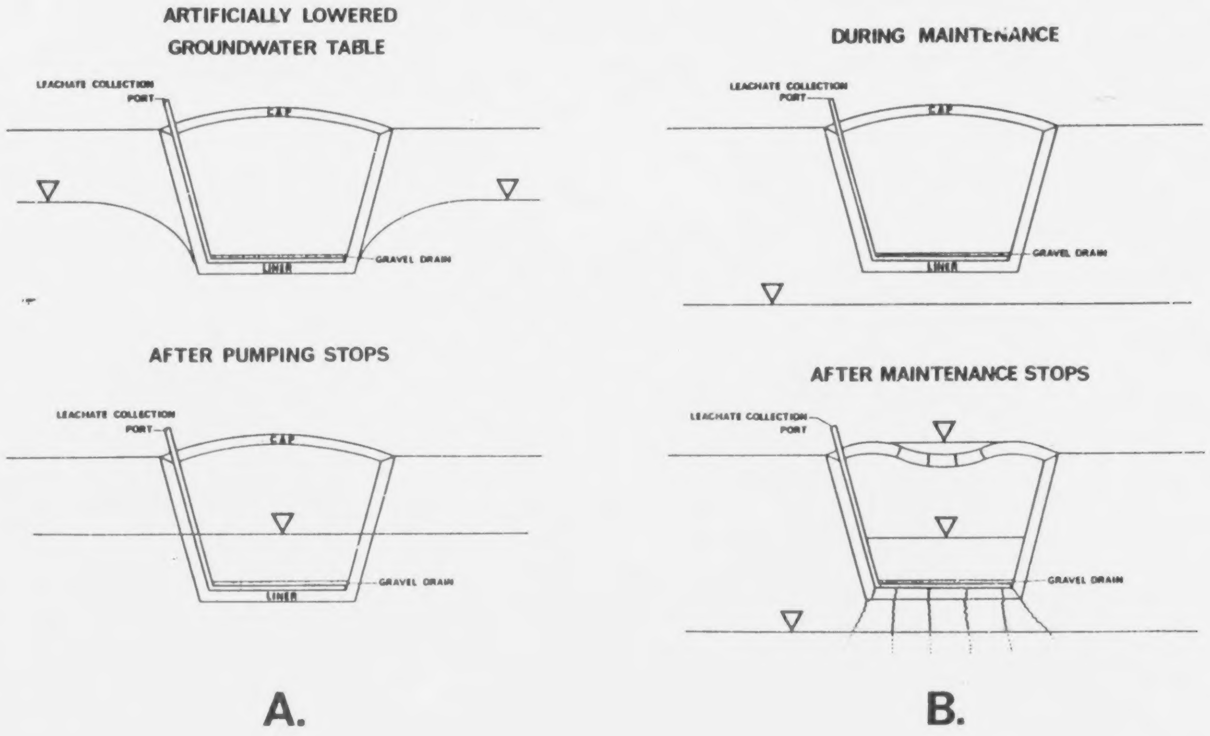

ARTIFICIALLY LOWERED GROUNDWATER TABLE
LEACHATE COLLECTION PORT
CAP
GRAVEL DRAIN
LINER
AFTER PUMPING STOPS
LEACHATE COLLECTION PORT
CAP
GRAVEL DRAIN
LINER
A.
DURING MAINTENANCE
LEACHATE COLLECTION PORT
CAP
GRAVEL DRAIN
LINER
AFTER MAINTENANCE STOPS
LEACHATE COLLECTION PORT
GRAVEL DRAIN
B.

Figure 2. Below ground landfills sited within a groundwater table require perpetual pumping to prevent groundwater contamination (Figure A); state-of-the-art below ground landfills may only reduce the potential for groundwater contamination until maintenance stops (Figure B).

contamination during the active life of a facility, the situation after maintenance stops may be quite different. As organic wastes decompose, voids form in the fill which may well cause the cap to settle and crack. Liquids may even pond on the cap or move through the cap and pond on the liner. The hydraulic gradient formed due to the ponded leachate could then accelerate leakage, liner deterioration, and groundwater contamination.

Improving Landfills

Landfills have come a long way in the past two decades, but there is still need for improvement. Lack of enthusiastic public acceptance and the threat of long-term liabilities due to groundwater contamination from below ground landfills are two of the indications that further changes are warranted. Current hazardous waste regulations limit the landfilling of liquids. The next step should be to reduce the landfilling of organic chemicals by encouraging the use of land treatment (for readily degradable organics such as oily refinery wastes) and incineration (for nondegradable organics such as PCBs). The remaining inorganic wastes and incinerator residues could be solidified and safely disposed in aboveground landfills.

Well designed aboveground facilities have the potential to both improve the acceptability and greatly decrease the pollution risks of landfills. Landfilling waste over an aboveground sloped base is an idea whose time has come.

INFORMATION ABOUT K. W. BROWN & ASSOCIATES

Solving environmental problems today requires a broad range of scientific and engineering expertise as well as knowledge of the governmental regulations that affect all aspects of waste disposal, surface mining, and contaminated soil cleanup. K. W. Brown & Associates has a multidisciplinary staff of professionals who can provide the state-of-the-art expertise needed to develop solutions to your environmental management and pollution control needs.

K. W. Brown and Associates (KWB&A) specializes in the treatment and disposal of both hazardous and nonhazardous wastes, cleanup assessment of salt and chemical spills, evaluation of liners to contain wastes, reclamation of mined and disturbed lands, and interpretation of soil analyses. Through research and consulting, KWB&A has developed an in-depth understanding of the movement and degradation of chemical compounds and plant nutrients in the soil environment which is an essential part of the solution to many environmental problems.

KWB&A has provided assistance to numerous clients, including corporate refineries, waste disposal companies, mining companies, manufacturing facilities, industries, utility companies, other environmental consultants, law firms, individuals, and federal, state, and local government agencies.

ALL CORRESPONDENCE SHOULD BE SENT TO:

David Anderson
K. W. Brown & Associates, Inc.
707 Texas Avenue, South
Suite 202D
College Station, TX 77840
(409) 693-8716

Symposium on Hazardous and Special Waste Management
St. Louis Section AEG
April 1982

FINANCIAL AND ORGANIZATIONAL IMPACTS ON THE HAZARDOUS WASTE MANAGER

by
Louis H. Knieper, Manager
BFI Waste Systems
Browning-Ferris Industries
Kansas City District

The past decade witnessed the maturation of the waste management industry, now a carefully designed and controlled business. This development was spurred on by state and federal regulation and by society's concern for the impact of man's activity on our environment. The most dramatic development has occurred since the passage of Resource Conservation and Recovery Act (RCRA) in 1976 more precisely delineating a chemical waste market.

Major technologies have not been altered significantly throughout this growth and development. Incineration, landfilling, and deep well injection procedures have changed only slightly from pre-RCRA operations. Physical/Chemical/Biological Treatment facilities and Recycling/Reclamation operations have developed significantly but remain only a small segment of the private waste management sector. The impact of RCRA has been most keenly felt at the pre-disposal operations level and in the peripheral support segments of a hazardous waste management facility.

Increased sophistication has been mandated in the protocols for chemical waste transportation, acceptance, off-loading, storage, and tracking (on and off site). Within hazardous waste management facility operations, regulatory impact has created improvements in communications, emergency response, record keeping, security, and equipment maintenance. The greatest challenge presented by RCRA was the development of adequately trained hazardous waste management facility personnel from managers to laborers. The greatest challenge created by RCRA is facility siting and public education.

Increased sophistication generally creates increased operational costs and therefore higher prices. As new facility siting and final regulations remain stagnant, supply and demand economics also serve to increase hazardous waste management costs.

The trend within the private hazardous waste management sector is to a large multi-faceted facility involved in treatment, storage, disposal, reclamation, and recycling. Such a facility may occupy 1000+ acres and process 50,000,000 gallons of waste a year for 20+ years. Generally the cost for developing such a facility, including false starts and delays due to public over-reaction, is estimated at over $15 million. Two to five years are anticipated between conception and operation. Operating costs are expected to exceed $5 million per year. Hazardous waste generators, therefore, can anticipate a disposal cost of $0.30 to $0.40 per gallon plus transportation. Generally, these chemical waste management centers will be few in number and strategically located.

Strong, credible regulatory agencies with good public awareness and education programs willing to take a leadership role in facility siting and permitting can certainly reduce the lead-time and expense of developing the next generation of hazardous waste management facilities.

Table 1

COSTS FOR NEW FACILITIES

Physical/Chemical/Biological Treatment	$4 - 6 million
Incineration	$10 - 20 million
Secure Landfill	$4 - 6 million
Deep Well Injection	$2 - 3 million
Chemical Fixation	$1 - 2 million
Sanitary Landfills	$1 - 2 million
Lab Facilities	$250,000 - 1 million
Permits	$250,000 - 2 million

Table 2

CURRENT DISPOSAL COSTS

Physical/Chemical/Biological Treatment	$0.04 - 0.05/lb.
Incineration	$0.08 - 0.20/lb.
Secure Landfill	$0.01 - 0.06/lb.
Chemical Fixation	$0.005 - 0.05/lb.
Deep Well Injection	$0.01 - 0.02/lb.
Recovery/Reutilization	Variable

VITA

General Information

Name: Frank Warren Wilson

Telephone: (Home) Unlisted
(Office) 913-864-4991

Present Address: 1627 W. 20th Terrace
Lawrence, Kansas 66044

Date of Information: June, 1981

Date of Birth: January 23, 1928

Education

B.S., Kansas State University, Manhattan, Kansas, Geology, 1951
M.S., Kansas State University, Manhattan, Kansas, Geology, 1957

Professional Experience

Senior Geologist, Kansas Geological Survey, The University of Kansas, 1980-present.
Section Chief/Associate Scientist, Environmental Geology Section, Kansas Geological Survey, The University of Kansas, Lawrence, Kansas, 1974-1980.
Engineering Geologist, Kansas Geological Survey, The University of Kansas, Lawrence, Kansas, 1969-1974.
Engineering Geologist, Kansas Highway Commission, 1952-1969.

Honors, Memberships, and Affiliations

Coombs Award (Outstanding Senior in Geology), Kansas State University, 1951.
President, Alpha Nu Chapter, Sigma Gamma Epsilon (Honorary Earth Sciences Fraternity), 1951.
Member, Association of Engineering Geologists (National offices held: Board of Directors, 1967-1968; Treasurer, 1968-1970; Vice President, 1971-1972; President, 1972-1973).
Fellow, Geological Society of America (National offices held: Member of the Management Board, Engineering Geology Division, 1974-1977).
Member, International Association of Engineering Geologists (U.S. Representative, Executive Committee, 1972-1978).
Member, International Society for Rock Mechanics, 1970-1975.
Member, Kansas Academy of Science, 1957-present.
Member, Seismological Society of America, 1977-present.
Member, Sigma Xi, 1979-present.
Member, American Institute of Professional Geologists, 1973-present.

Supplemental Information

Professional Registration

Registered Geologist, State of California, #2501.
Registered Engineering Geologist, State of California, Cert. #736.

Outside Funded Research

Principal Investigator, "A Study of Regional Tectonics and Seismicity of Northeastern Kansas." U.S. Nuclear Regulatory Commission Contract No. AT(49-24)-0286, KU #4532-X705--May 15 to December 31, 1976. $48,080.

Principal Investigator, "A Study of Regional Tectonics and Seismicity of Kansas." U.S. Nuclear Regulatory Commission Contract No. NRC-04-77-17, KU #4432-X705, October 1, 1976 to September 30, 1981. $568,000. This includes coordination and synthesis of data compiled by researchers of the Oklahoma, Nebraska, Iowa, and Missouri State Geological Surveys and preparation and editing of the final cooperative report.

Co-Principal Investigator, "Operation Maintenance and Data Analysis, Microearthquake Seismograph Network near U.S. Corps of Engineers reservoirs in NE Kansas." U.S.C.E. contract, May 1 to September 30, 1977. $3,291.

Principal Investigator, "Water quality aspects of sanitary landfill location and design; guidelines for site selection (subtask 21-C). Development of hazardous waste control program; Control alternatives (subtask 22-B), and guidelines for systems approval (subtask 22B) of State Water Quality Management Plan." Kansas Department of Health and Environment Contract, FY-1977-78. $19,190 for three subtasks listed.

Co-Investigator, "Study of stability problems and hazard evaluation in the Kansas portion of the tri-state mining area." U.S. Bureau of Mines. $90,000, 1980, 18 months.

Board and Committee Service

Founding member and first chairman, Association of Engineering Geologists, Kansas City Section, 1967-1968.
Member, National Seismic Hazards Committee, Association of Engineering Geologists, 1974.
Chairman, Committee to revise Constitution and Bylaws, AEG, 1973-1976.
Member, Management Board, Engineering Geology Division, Geological Society of America, 1973-1974.
Chairman, Burwell Award Committee, EGD-GSA, 1975-77.
Member, Engineering Geology Committee, Transportation Research Board, National Research Council, 1973-1981.
Member, Natural and Scientific Areas Advisory Board, Kansas Park and Resources Authority, 1973-present.
Member, Environmental Protection Committee, Interstate Oil Compact Commission, 1974-present.
Member, Promotion and Review Committee, Kansas Geological Survey, 1980-1982.
Member, Affirmative Action Committee, Kansas Geological Survey, 1978-1980.
Ad Hoc Member, Graduate Faculty in Geology.
Courtesy Associate Professor of Geology, The University of Kansas, Geology 551, Engineering Geology, Spring Semester, 1979-1980.
Courtesy Professor of Geology, 1980-present.
Member, Steering Committee, U.S. National Group, International Association of Engineering Geologists, National Research Council, 1980.
Member, Management Board, south-central section, Geological Society of America, 1981-1983.

Member, Editorial Review Board, Bulletin of the Association of Engineering Geologists, 1980-present.

Member, Review Board, AEG Student Professional Paper Award, 1981.

Member, Joint Technical Program Committee, Reviewer of Engineering Geology papers to be presented at the Annual Meeting, Geological Society of America, 1981.

Secretary, Engineering Geology Division, GSA, 1981-1982.

Member, Planning Committee, Special Governor's Conference on Hazardous Waste Disposal, Center for Public Affairs, The University of Kansas, 1981.

Other Projects and Activities

Primary Geological Reviewer--of the geologic sections of Environmental Impact Statements for all federally-funded projects in Kansas, 1973-present.

Governor-appointed Technical Advisor, Observer, and Liaison--To the U.S. Air Force Weapons Laboratory on Operation Hardpan, a project using conventional explosives to simulate the effects of a nuclear strike on Minuteman Missile emplacements at Whiteman AFB in west-central Missouri. The experiment was conducted in eastern Kansas and concluded with the largest blast ever to have been detonated in the state. The blast was recorded as a Richter Magnitude 3.2 earthquake at distance stations. Involvement included review of plans, advice to two governors and staffs, supervision of seismograph monitoring, observation of tests, and reports, 1973-1975.

Advisory Consultant--to the Chief Engineer, Water Resources Div., State Department of Agriculture on the geological elements of design and construction of dams and reservoirs. Currently includes evaluation of design and on-site inspection of construction of dams at KP&L's Jeffrey Energy Center in Pottawatomie County and KG&E-KCPL Wolf Creek Nuclear Power Plant near Burlington, Kansas, 1973-1980.

Governor-appointed State Liaison Contact--to the U.S. Geological Survey, geologic-hazards warning system. Applied mainly to potential mine collapse, earthquakes, ground subsidence, and slope failures involving loss of property, 1975-present.

Advisor--to the State Office of Emergency Preparedness concerning geologic or earth-related hazard areas in the State Emergency Preparedness Plan, 1974-present.

Advisor--State Division of Planning and Research concerning geologically fragile or critical areas, 1973-1978.

Supervisor and Co-Investigator--Statewide study of sinkholes and salt-related subsidence areas, 1978-present.

Co-Investigator and Coordinator--Development of geologic criteria for disposal of hazardous wastes and for the location, evaluation, monitoring of sanitary landfills under the State Water Quality Management Plan, Section 208, P.O. 92-500, 1978-1979.

Supervisor and Co-Investigator--Investigation, siting, and management of The University of Kansas low-level radioactive and The University of Kansas Medical Center toxic and biologic waste disposal sites, 1979-present.

Supervisor and Co-Investigator--Preparation of county geologic maps at 1:50,000 metric scale and synthesis of derivitive environmental geology maps and reports for planning purposes, 1978-present.

Principal Investigator--Terrain analysis and ground-truth studies of possibly geologically young faulting in Kansas and the Midcontinent, 1978-present.

Observer and State Reviewer--Past proposal by the U.S. Atomic Energy Commission to dispose of high-level radioactive wastes in an abandoned salt mine at Lyons, Kansas, and a present proposal by Rickano, Inc., a possible offshoot of Southwest Nuclear, Inc., to develop the Lyons mine as a commercial low-level radioactive waste storage site, 1969-present.

Coordinator--Geologic and hydrologic investigation of a proposed expansion of the KIES industrial waste disposal facility in Sedgwick County, Kansas for the Department of Health and Environment and the Kansas Attorney General. 1981.

Publications

Wilson, F.W., 1957, Barrier Reefs of the Stanton Formation (Missourian) in southeast Kansas: Unpublished Master's Thesis, Kansas State University. Published in summary under same title, Kansas Academy of Science Transactions, 1957, v. 60, p. 429-436.

Wilson, F.W., 1957, Depositional environment of the Stanton Formation in southeast Kansas: Kansas Geological Society Guidebook, 21st Field Conference, p. 123-126.

Wilson, F.W., 1962, A discussion of the origin of the reef-like limestone lenses of the Lansing Group (Upper Pennsylvanian) of southeast Kansas: Kansas Geological Society Guidebook, 27th Field Conference, p. 101-105.

Wilson, F.W., 1965, Some suggestions for improved cut and embankment slopes: Flint Hills Geological Society Symposium on Applied Geology.

Wilson, F.W., Highway problems and the geology of Kansas: In: Proceedings, 21st Highway Geological Symposium, p. 1-18.

Wilson, F.W., 1970, Kansas - A geologic profile: Kansas Magazine, p. 2-8.

Wilson, F.W., (co-ed.), 1969, Kansas Geological Survey Environmental Geology Digest, v. 2.

Wilson, F.W. (co-ed.), 1970, Proceedings of the 21st Annual Highway Geology Symposium.

Wilson, F.W., 1974, Generalized Geologic Map of Kansas: Kansas Geological Survey.

DuBois, S.M., and Wilson, F.W., April, 1978, List of earthquake intensities for Kansas, 1867-1977: Kansas Geological Survey Environmental Geology Series 2, 56 p., also published August, 1978, as U.S. Nuclear Regulatory Commission NUREG/CR-0294.

Berendsen, P., Wilson, F.W., Yarger, H.L., and Steeples, D.W., [in press] New data on major basement fractures in the tectonic development of eastern Kansas: Proceedings of the 3rd International Conference on Basement Tectonics, Durango, Colorado, May, 1978.

Young, R.M., Dickey, H.P., and Wilson, F.W., 1978, Suitability of Kansas soils and geology for receiving solid wastes: Kansas Geological Survey Map M-13.

Wilson, F.W., 1979, Kansas landscapes: A geologic diary: Kansas Geological Survey Educational Series 5.

Wilson, F.W., March, 1979, A study of the regional tectonics and seismicity of eastern Kansas - Summary of project activities and results to the end of the second year, or September 30, 1978: U.S. Nuclear Regulatory Commission, NUREG/CR-0666.

Steeples, D.W., DuBois, S.M., Wilson, F.W., April, 1979, Seismicity, faulting, and geophysical anomalies in Nemaha County, Kansas: Relationship to regional structures: Geology, v. 7, pp. 134-138.

Wilson, F.W., Summer, 1979, Earthquakes in Kansas?: Kansas Geological Survey Journal, v. 1, no. 3, pp. 9-12.

Wilson, F.W., August, 1979, Nemaha uplift seismotectonic study; regional tectonics and seismicity of eastern Kansas: U.S. Nuclear Regulatory Commission, NUREG/CR-1144.

Bayne, C.K., O'Connor, H.G., Wilson, F.W., The geologic section of Kansas: Kansas Geological Survey Bulletin 221, [in preparation].

Wilson, F.W., Earthquakes in Kansas? The problem of communicating earthquake risk in areas of infrequent seismicity: Engineering Geology Division, Geological Society of America Case Histories, [in preparation].

FRANK W. WILSON

KANSAS GEOLOGICAL SURVEY

BEFORE THE SENATE COMMITTEE ON ENERGY AND NATURAL RESOURCES

March 1, 1982

This is an outline of the chronology and a description of significant events associated with the Kansas Geological Survey's investigation of the proposed expansion of the NIES industrial waste disposal site near Furley, Kansas, and subsequently.

In the late fall of 1980, KDHE was apparently on the verge of issuing a permit to NIES to expand its operations to an 80 acre site adjacent and south of its existing facility. This was based on a favorable review by KDHE staff of a geotechnical investigation and report done by Haliburton Associates of Stillwater, Oklahoma. The principal in that firm is T. Allen Haliburton, Ph.D., a professor of soils mechanics on the faculty of the Civil Engineering Department at Oklahoma State University.

Residents of the area objected to the Haliburton report because they felt it did not accurately reflect their knowledge of the conditions, especially of groundwater and geology on and near the site. They were supported in that contention by Dr. Robert Berg, a long-time professor of geology at Wichita State University. Dr. Berg appealed to Attorney General Stephan for an independent evaluation and suggested it be done by KGS. Attorney General Stephan then threatened to enjoin Secretary Harkens from issuing the permit unless this was done.

Secretary Harkins and several key members of his staff came to the KGS in late December, 1980, and met with Dr. William Hambleton and key members of our staff.

Secretary Harkins requested that we undertake field and laboratory investigations to verify the results of the Haliburton study.

KDHE stated that they did not have funding for this study and asked that we do it as a service to them. I objected because it would be necessary to take professional staff off on-going research and bring the drill crew in from the field where they were doing the annual state-wide water-level inventory. I've had considerable experience with trying to do studies involving core drilling and augering in the winter. Murphy's law and all its corollaries immediately go into effect. Further, I felt that KGS would be put in an untenable position between NIES-KDHE and the people.

Despite my objections, Dr. Hambleton agreed to do the study and put me in charge of lining up a team and putting together a program. Secretary Harkins requested that I prepare a work plan, with deadlines, as a part of a memorandum of agreement. He requested that, because this was a sensitive project, that all contact with the local people or media be referred to him. Again, I objected because we were undertaking the study with public funds. Dr. Hambleton agreed, however, with the stipulation that our data be released after one year from date of conclusion. Later, after studying the Haliburton report and attempting to write a memo of agreement, it became obvious to me that if we used the same field and soils laboratory procedures, we would likely duplicate and verify his results without addressing the objections of the people. Further, although we have standard soils laboratory testing equipment, we did not have the rather expensive equipment to test for permeabilities in the ranges reported by Haliburton.

Instead, I decided to do what we do best and put together a field laboratory and office study of the geology and hydrology of the site. The details of it are in the report which you have in your packet. Essentially, I decided to drill one deep core drill hole for site stratigraphy, auger a number of observation wells around the site, especially near the locations of Haliburton's holes, and to install near each observation well a field permeameter.

The field permeameters were similar to the observation wells, but instead of measuring static water levels, they would be filled with pure water. After initial saturation, the well would be refilled and the falling water levels measured against time.

I also outlined some standard soils sampling and tests and sampling for inorganic chemical analyses of water from site test holes, and offsite springs, and wells on surrounding farmsteads. The staff felt much more comfortable with this plan.

It was January 23, 1981, by the time the agreement was prepared and signed by both agencies, and men, equipment and supplies organized for the field work.

Upon arriving in the field, the core-drill crew and one of our geologist-hydrologists began drilling and carefully logging the strat hole. Our soils scientist and soil geochemist began auger sampling and logging of a hole in the SE corner of the site. I began taking water samples from the springs in creeks around the site and existing wells on the farmstead.

Haliburton had reported there was one well near the farmhouse, and that it was said by the farm occupant to be 55 feet deep and dry. He reportedly drilled a hole 40 feet west of the well to below the elevation of the bottom of the well and reportedly found no water. I measured that well as soon as we got organized, and found water at 42 feet. Another more modern well with a concrete block enclosure was plainly visible about a hundred feet west of the windmill well and it contained water at about 55 feet. I later found another abandoned well with a pump on it in a pasture north of the farmstead. It also contained water.

Springs in streams north and south of the site, especially Prairie Creek, were flowing strongly despite the fact that the area was in a period of drought, with precipitation 10 inches below normal.

As drilling on the strat hole progressed, the geologist logging the hole noted losses of water in the steel portable mud pit and began logging the quantities of make-up water that had to be added. It soon became apparent that the losses far exceeded the volume of the advancing hole and that zones of relatively high permeability were being encountered by the drill. Below the upper weathered clay shale zone the drill cuttings of the shale were brittle rather than plastic and showed stained laminations. Thin layers of soft limestone, gypsum, and anhydrite were frequently encountered and drilling fluid losses increased.

The soils scientists, working at the SE corner of the proposed site, augered up a creamy saturated mud and upon completion of the hole,, a standing water level was measured about five feet below that reported by Haliburton in June, 1979. He had stated that water only was found in that hole and that it was an isolated discontinuous zone. I later learned that the District Geologist for KDHE was present for about 15 minutes when the water was found, but that he had not been present when the other holes were drilled.

We then drilled auger holes near most of Haliburton's test holes in the corners of the site and in the pasture in the middle of the site. Except for the northeast corner, we augered water to the surface immediately after encountering limy or gypsum zones either at a depth of about 40 or 60 feet. These were at elevations above the levels of the bottoms of Haliburton's reportedly dry holes.

The permeameters were installed, filled with Wichita city water (incidentally, the core hole was also drilled with city water and samples taken for analysis) then refilled several times before measurements were taken. All holes were cased with 4-inch PVC pipe sealed at ground level with tamped, dry bentonite drilling mud, vented, capped, and sealed to prevent tampering. I measured the drawdown of the permeameters and water levels in the observation wells in rotation every few hours for the first few days and every few days for a period of several weeks. All permeameters were recharged at least four times. Water samples for inorganic chemical analysis were taken from the observation wells several times. Ground-level elevations of all holes were surveyed in by me personally. The soils scientists and hydrologists sampled all of the known springs and measured and sampled all available farm wells within a several miles radius of the site.

Pumping tests were run at the request of KDHE on the core-drill hole and the windmill well. These were not successful because the capacity of the pump, intended for testing in unconfined alluvial aquifers, was too large to attain steady-state flow. However, while looking for a place to drill a drawdown observation well near the watermill well, we discovered Haliburton's hole and drilled about five feet from it. We augered water to the surface from 40 feet. The level coincided with the water level in the windmill well.

Field data collection was completed in early spring. Soils analyses, chemical water analyses, and permeability calculations were completed about a month later. I made final water-level measurements of the observation wells in early May, accompanied and witnessed by the district geologist, KDHE. Pipe was later retrieved from all holes (except CD-1 left for monitoring by KDHE) and they were plugged to the surface with dry drilling mud as approved by KDHE. Compilation of data, analysis and report writing required another month.

We delivered the report to KDHE on June 4, 1981, four days past the original deadline. Our conclusions and recommendations were as follows:

CONCLUSIONS

It seems probable from elevation relationships that the first and second aquifers contribute to the spring flow in Prairie Creek, but we did not attempt to directly confirm this by drilling. The upper aquifer is at a higher elevation than the stream directly north of the site, but where the limestone is dissolved in the highly weathered or oxidized zone near the surface, the water may migrate downslope along the weathered-unweathered interface and discharge as stream-bank or stream-bottom seepage. The second aquifer is at the level of Prairie Creek north of the site and may contribute directly as spring flow.

If there is a connection between the aquifers and the springs in Prairie Creek, there could be a possibility of contamination by any leachate escaping from the proposed burial trenches because the volume of water probably is not sufficient to dilute it.

1) At least two water-bearing zones exist beneath the site at approximate elevations 1350 and 1337 feet.

2) Both are usable aquifers. (Contains quantities of groundwater sufficient to provide domestic and stock water supplies in the local area.)

3) Comparison of the elevations of water levels measured by KGS in 1981 during a period of drought with those reported by site geotechnical consultants in 1976 and 1979 indicate that the water levels of the aquifers may be at least five feet higher, or at elevations 1355 and 1342 feet, during normal times.

4) The elevation of the bottoms of proposed disposal trenches is 1358-60 feet. The water levels in the upper aquifer will likely be less than five feet below the bottom of trenches in times of normal precipitation.

5) Tests suggest that material between the bottom of the proposed trenches and the top of the upper aquifer is more permeable than reported by the geotechnical consultant.

6) On the basis of the above, the site as it is proposed to be operated, does not meet the present criteria of USEPA or KDHE.

7) The site geotechnical consultant either did not find or did not report the presence of the upper aquifer except in HA-4 in the southeast corner of the proposed site. This was the only test hole at which the District Geologist of KDHE was present during the investigation and he observed saturated material being augered to the surface. All other holes, including existing water well 1-A were reported by the consultant to be dry. Test holes were drilled by KGS close to the locations of holes that were reported to have been dry by the geotechnical consultants for the existing site and the proposed site. Water was found immediately or within 24 hours at levels above the bottoms of the reportedly dry holes at the northwest corner, southwest corner, and in the center of the site. KGS investigators can think of no technical explanation for these apparent discrepancies.

The following day, Friday, June 5, I was contacted by KDHE and requested to visit them on Monday at 2 p.m. with some of my people to explain some of the technicalities.

On Monday at about 11 a.m. I was called by Randy Rathbun, a lawyer for the people around the site, inquiring about details of the report. I was amazed to learn from him that Secretary Harkins and Attorney General Stephan had flown to the Wichita airport and held a 10 a.m. news conference to read the executive summary of our report, answer questions, and to announce that the full report would be released within a week.

At 2 p.m., the geo hydrologist who had worked with me at the site and I met with Bill Bryson, Mel Gray, Jim Aiken, Howard Duncan, and an EPA representative from Region seven who was an observer.

It was apparent from the start that they did not like our findings and Gray attempted to discredit our permeameter analysis. Pat Cobb did an excellent job of defending and explaining the certainties and uncertainties involved.

At 3 p.m. a hearing was held at the Shawnee County District Court on the suit by NIES, requiring KDHE to issue a permit to expand onto the proposed site. The judge took it under advisement. I learned later our report was not mentioned, although the reason stated by Harkins that KGS should not discuss it was because of the pending litigation.

On Tuesday, June 9, Gary Haden of the Wichita Eagle-Beacon called to tell me that he had learned that on the previous Friday, a day after they had received our report, KDHE had invited Haliburton, the NIES manager, and its lawyer to KDHE headquarters to review our report.

On Wednesday, June 10, Mel Gray called to ask for 20 additional copies of the report and to ask if I objected to their hiring an outside "independent" consultant to review Haliburton's and our report? I asked him where he was going to get the money since they did not have funds to support our study? He said, "from a non-funded account" or something to that effect. I then asked him why he hadn't informed me on Monday that NIES and Haliburton had been invited to review our report? He said he had not been "totally candid." I told him I did not object to their getting another consultant, but if I ever found out what they paid him, I was going to forward an invoice for that amount.

On Thursday, June 11, Hayden called to tell me that he had interviewed Haliburton by telephone about a hazardous waste study in Oklahoma which had been turned down by the Oklahoma Department of Environment because he had not reported the presence of shallow aquifers. Haliburton said, "My opinion was that it was not relevent; I was not paid to look for water, I was paid to look at the soil." I later informed Gray of this and he said a dirty word. Haden reported that Haliburton would be on vacation from June 14 to 29. Our full report would be released to the news media on Monday, June 15.

On Monday, June 15, a full week to the minute, the report was released simultaneously at 10 a.m. in Topeka and Wichita. Within an hour, I was besieged by media reporters asking about the report. I had to tell them that I couldn't talk about it and referred them to Secretary Harkins. Rex Buchanan, our director of information and education, called Haydn and asked if KDHE had issued a press release with the report. He said KDHE was engaging an independent consultant to review the KGS and Haliburton reports and that they would announce who by the end of June. NIES issued a press release shortly after saying it had engaged Woodward-Clyde Consultants of Chicago to do a complete study and evaluation of the proposed site.

Dr. Hambleton was on the east coast attending a meeting. After several attempts, I finally reached him and informed him of the situation, stating that I felt our agreement had been broken and asking for permission to talk with the media. At first he seemed to agree, but later called back to say he had talked to Secretary Harkins and that Harkins requested we not discuss it because of the pending litigation. I again objected quite strenuously.

Over the next week, Aiken, Goetz, and others from KDHE were quoted by the press.

About the middle of July, 1981, Dr. Hambleton and I were asked to meet with KDHE in Topeka to review the report by CH_2M-Hill, the consultant for KDHE.

The conclusions were as follows:

1. None of the work conducted by either Haliburton or KGS can be considered "state of the art" for investigative work for hazardous waste siting studies.

2. For the techniques utilized, permeability numbers determined in the laboratory by Haliburton and in the field by KGS are reasonable. The apparent discrepancy may be related to the fact that each study was measuring different materials. Also, sealing techniques for field measurements by KGS may have an impact on permeability computations.

3. The Haliburton report did not integrate hydrologic aspects. Similarly, the KGS report did not integrate geotechnical aspects. Thus, neither study is complete for siting evaluation.

4. Discrepancies in water-level readings between Haliburton and KGS work may be due to time differences between completion of drilling and recording water level, if any.

We were asked by KDHE whether we wanted to continue to be kept informed? I stated emphatically that as we had a considerable investment and considered our work to be a research project, and that we certainly did.

We heard nothing further until Friday, January 15, 1982, when Mel Gray called to inform me that he was sending a copy of the Woodward-Clyde report for my review. He also asked that Dr. Hambleton and I come to Topeka for a meeting on January 28. He did not say for what reason.

The Woodward-Clyde investigation of the proposed site was very similar to ours - using field permeameters and observation wells plus extensive laboratory tests and analyses. Their investigation took longer, was more extensive in that they did more core drilling, and undoubtedly was much more expensive. Their findings, however, were very similar to ours in that they came to the same conclusion as to the two water-bearing zones and that the field permeabilities were greater than the laboratory permeabilities. Their groundwater model was essentially the same as ours in that they concluded that local precipitation fed the water-bearing zones through vertical fractures and then moved laterally through broken zones or solution cavities associated with thin limestones and gypsum beds. Dr. Hambleton and I concluded that our investigation was state-of-the-art.

On Monday, January 18, a reporter from the Wichita Eagle-Beacon, called to tell me that Governor Carlin and Secretary Harkins had scheduled a 4 p.m. airport news conference. He speculated that something had been found at NIES and they were shutting it down. This was confirmed by the 6 p.m. television news.

Mel Gray called the next morning to tell me that KDHE geologists had drilled a line of auger holes along the north line of the existing site and late Thursday, January 14, and had discovered organics moving offsite near the evaporation ponds. The KDHE lab worked over the weekend analyzing the samples and confirming strong concentrations of organics. At 11 a.m., Monday, they contacted NIES and closed operation of the site.

FRANK W. WILSON

KANSAS GEOLOGICAL SURVEY

BEFORE THE SENATE COMMITTEE ON ENERGY AND NATURAL RESOURCES

March 2, 1982

I learned subsequently that EPA had first detected organics in a spring on Prairie Creek in October and had informed KDHE. The EPA sampling had been done at the request of Furley residents. Randy Rathbun had asked me to recommend sampling sites, and I had suggested the springs in Prairie Creek because I had said in our report that if contaminants escaped from the proposed site, that they would likely show up in the springs (page 21, last two paragraphs).

Rechecking and core drilling by KDHE in November and early December confirmed EPA's findings.

After informing me of the details, Gray asked me to attend a meeting at KDHE on Monday, January 25, to review a proposal by Woodward-Clyde Consultants to investigate the origin of the leachates, and steps to alleviate and clean up the contaminants.

He said the January 28 meeting would still be held, but that it would be on a different subject.

Secretary Harkins had told the news media that a decision would be announced by February 1 as to whether or not the proposed site would be authorized. I speculate now that the original purpose of the January 28 meeting was to inform us of their intention to issue the permit.

On January 25, WWC explained their timetable and phased steps for investigation of leachate movement and clean up. This involved about 50 observation wells to different depths spaced about 200 feet apart along the north line and around the evap ponds and barrel trenches as well as others scattered around the site. When asked what measures would be taken immediately to alleviate the situation, they said if contaminants were found that they would pump the holes to remove the fluid and reduce the driving head. I suggested that would likely not be effective because of the wide spacing of the holes and the likelihood that leachate was moving in locallized solution channels or broken zones which could be missed by the observation wells. I later suggested to Secretary Harkins that an interceptor drain be installed opposite the leaking ponds. He said that had been suggested by Woodward-Clyde originally, but after second thought, they preferred to drill test holes first.

I left the meeting at that point, but learned later from Gray that NIES had requested Secretary Harkins to allow them to operate the trench burial while they cleaned up the evap ponds if they could prove the leachate was not coming from the trench area. They also requested consideration for construction of new ponds on the proposed site to which the fluids and sludges from the leaking ponds could be transferred. Secretary Harkins denied both requests and NIES officials returned to Wichita and in a news release stated that, because of his denial, instead of bringing in people and equipment from their other facilities on a priority basis, they would proceed in a routine manner with site equipment and personnel.

At the January 28 meeting, NIES officials were not present. The CH_2M-Hill consultant to KDHE reviewed the WWC proposed site investigation and report. At the close of the meeting, Secretary Harkins appointed Mel Gray, John Ramage of CH_2M-Hill, Robert Morby of the Hazardous Waste Division of EPA, and me as a small committee to review the detailed proposals from WWC for clean up and to make recommendations to him. The first meeting was to have been yesterday, but was cancelled.

In mid-February, Michael Ginsburg of the Eagle-Beacon sent me copies of internal EPA memos and organic analyses from the NIES site monitoring wells and the site sanitary well. These documents had been obtained by Sharilyn Dienst, a resident near the site, through Freedom of Information Act proceedings.

The samples taken September 17, 1980, showed organic compounds in nearly all the wells, but especially well 8 near the northeast corner. This well contained 15 different organic compounds including 1, 1, 1, trichloroethane at 5200 ppb, carbon tetrachloride at 2800 ppb, trichloroflouromethane at 1900 ppb, and trichloroethylene at 1800 ppb. The memos discussed the sources of the contamination. NIES contended that the wells were inadvertantly contaminated by unsupervised employees who had bailed the holes before sampling with a homemade bailer using a clothesline, coffee can, coathanger wire, and weighted by a piece of PVC pipe. The pipe, taken from somewhere on the property, contained according to the EPA sampler's report a "highly viscous, black, tar-like liquid." The pipe was from Double Eagle Waste Oil Reclamation Company's disposal pits in Oklahoma. EPA cut the pipe in half and sent half of it to KDHE along with copies of the samples analysis. The internal memo transmitting the sample to the EPA organics lab warned that the sample very likely contained PCB residue and, therefore, should be handled carefully and safely.

The analysis reported two substances, one a plasticizer which probably came from the plastic pipe at 3 ppb, and another compound at 38 ppb. The second compound was not reported in any of the wells.

It appeared to me that the bailer could not have been the source of contamination. The chemists in our Geochemistry Section also agreed it was unlikely.

I checked with Robert Morby of EPA and he said it was possible, but as they had not resampled for organics since, he couldn't tell. He said the information was not sufficient to proceed with an imminent and substantial endangerment case, but it was serious enough that EPA brought it to the attention of the state of Kansas. Morby also told me that as early as September, 1979, the facility service well showed organic contaminants.

In an interview with Ginsberg, published in the Eagle-Beacon, Secretary Harkins said subsequent testing at unspecified dates showed the same contaminants at lower concentration levels. He said, "My staff tells me that the EPA findings are explainable by the fact that there was water in the well and the pipe was actually washed in the water, which left the contamination in the well. He said the lower concentrations found in later tests and the decision by EPA not to act on the 1980 findings have reassured him that the well contamination was not an early warning of the problems that have since been discovered."

I wish I could be as sure.

If this had been done as I
suggested, the migration to the
North would have been
stopped immediately.

January 27, 1982

Mr. Joseph Harkins
Secretary, Dept. of Health & Environment
Building 740
Forbes Field, KS 66620

Dear Mr. Harkins:

After thinking about the Woodward-Clyde proposal overnight, I have some suggestions for your consideration.

First, to promptly alleviate the problem of offsite migration of leachate, I recommend that an intercepter drain be dug along the north line of the site as close as possible to the evaporation ponds. It should be started at the west end and carried downward until water is found. Digging then should proceed eastward until water is no longer found.

The walls of the trench should be mechanically shored, and then accurately mapped and photographed in detail for any fractures or solution channels which may be locallizing the leachate movement, although that probably will be obvious simply by observation.

The bottom of the trench should be sloped toward a sump and the bottom cleaned up. An acid/caustic-resistant perforated drain pipe of proper size should be placed in the bottom and the trench back-filled (at least the part directly over the pipe) with a suitably sized siliceous sand and gravel or some other type of similar granular material. This should be carried to within a few feet of the surface. The drain outlet and sump should be formed in concrete or cased to the surface with a pipe or shaft of sufficient size to allow access to the drain outlet for inspection or cleaning in the event that it gets clogged. An acid/caustic-resistant pump can then be installed to pump out the leachate.

The trench will remove any doubts about leachate movement in the upper water-bearing zone which might be missed by the proposed WCC piezometers and will immediately and positively cut off leachate migration to the north.

Some piezometers should be installed north of the trench to confirm when the leachate movement stops.

Piezometers should also be drilled to the second zone to assure that the leachate is not present there and extended as suggested by WCC east along the north line, etc.

NIES has an application pending with KDHE for an Arbuckle disposal well. Vulcan Chemical Co. is successfully (according to Bryson) operating five such wells. Such a well could be used at NIES to dispose of the organic leachate, and if the chemistry of the fluid contents of the evap ponds could be adjusted to the Arbuckle water chemistry, it might be used to dispose of the pond fluids as well, thus reducing the volume of material that will have to be stored or buried. If the well is not feasible, incineration of the organics would be a less costly alternative.

In the event that NIES can prove to your staff's satisfaction that the organics are not escaping from the barrel trenches and you authorize operation of that part of the site, I would suggest that you stipulate that an underdrain system be installed to collect any leachate that might escape from deteriorating containers or caused by surface infiltration at some time in the future. I have given Bryson references on that, and WCC & CMM should be aware that this is routinely done in state-of-the-art installation.

Mel Gray sent me a copy of the WCC site report for our review. It is a good and factual report and I agree with its findings. It corroborates almost exactly our findings and conclusions.

Sincerely yours,

Frank W. Wilson
Senior Geologist

FWW:ep

cc: W. W. Hambleton

February 15, 1982

Mr. Joseph Harkins
Secretary, Dept. of Health & Environment
Building 740
Forbes Field, KS 66620

Dear Secretary Harkins:

Last week EPA sent me a copy of Mel Gray's February 1, 1982 letter to NIES concerning approval of their four-step proposal to investigate, define, control, and clean up the leakage from the NIES disposal site. EPA got a copy of the letter from Cliff McDaniel of NIES during a visit by him to their offices. The approval added the provisions agreed upon at our January 28 meeting.

I am concerned that my proposal for a shored exploratory trench to determine directly the location, depth, and mode of leachate movement (diffused or in cavernous zones) was not considered. Subsequent conversion of the trench to a positive cutoff curtain drain, as suggested by me previously, would stop further migration off site. I think this is important because the organics seem to be very mobile and are under a considerable driving head from the liquids in the lagoons. If the WCC study takes an estimated minimum of 4 to 6 weeks (and from my past experience last year and many years before, I would say it will take at least twice as long) a considerable volume of organic and inorganic leachate may move off site during that time.

As I stated at the January 25 meeting, I do not agree with WCC's proposal to control leachate movement by pumping wells containing contaminants. If movement is through locallized cavernous zones as I suspect, then these wells spaced on 200 feet centers will likely not be effective.

After thinking about it and discussing it with other members of our staff, I now think it was premature to have closed CD-8 and perhaps other sampling points which initially showed contaminants and later "cleared up."

It is our opinion that the organics may move in pulses, slugs, or waves depending on the relative water solubility, miscibility, viscosity, etc. of the various organic compounds. The fact that the compounds and concentrations found in the spring 1/2 mile north of the site and reportedly in CD-8 approximately 3/4 mile SW are similar, may be significant. This may represent a very mobile first or early pulse. It is important, I think, to pay close attention to analyses of monitoring wells around the site and to the closest private wells in all directions until we know more about the mechanics of flow.

I have formed some tentative ideas about the origin and movement of the organics. In our discussions on January 28, I asked Gray about reports from your people that the facility well was contaminated by organics. He confirmed it was, but said that it could be from the run of PVC pipe from the well to the facility. Morby said there were other organic contaminants besides vinyl chlorides involved. Does KDHE know what these were, in what concentrations, and how long ago they were first noticed? This is important because, if the well is pumped regularly, it may be drawing organic contaminants from the leaking lagoons or barrel trenches, and it might give some indication of the time span of leachate movement. Because the well is pumped frequently, it is unlikely that contamination is due to sloppy sampling techniques.

It seems likely to me that the original source of the organic leachate is the trench burial. Duncan confirmed that all the compounds found so far were denser than water. Gray said that the site withstood a 500-year storm this summer without overflowing the lagoons, but that the trenches were flooded. This could have provided a driving head to flush the organics horizontally along porous zones into the unlined lagoons which are about 45 feet deep and whose bottoms are lower in elevation than the trenches. The organics would settle to the bottoms of the lagoons and again move horizontally through the permeable or cavernous upper or lower water-bearing zones which probably were exposed during excavation of the lagoons. The fact that the concentrations of organics in the lagoons are less than at depth at the north boundary could be explained by the fact that the concentrated compounds, because of their density, do not mix upward with the lagoon water. If this is the case, then the concentrated organics are under a considerable head of water, as stated earlier. Removing the fluids will decrease the flow, but the contaminants ouside the site will continue to migrate. That is why I suggest the trench to cut off the flow now. That would allow a more leisurely cleanup of the lagoons.

At your next contact with WWC, I suggest you ask them if they had considered electrical resistivity or thermal probes for detecting the plume off site. These are ground-surface methods which might work and would be cheaper and quicker than boreholes.

I was contacted by telephone on February 11 by the legislative assistant to Senator Francisco who said that Chairman Angell had requested Francisco to ask that I appear before the Senate Committee on Energy and Natural Resources at 8 a.m., February 23. The hearing concerns S.B. 600. The exact subject of my testimony was not stated. I presume that I will be asked to explain the results and significance of our 1981 study of the proposed site, but questioning could lead to the contents and results of the WCC reports and other subjects which are known to me only because of the January 25 and 28 meeting at KDHE. Because the latter will be involved in the NIES suit and the local

Mr. GLICKMAN. Thank you all.

Dr. Berg, it was mentioned that you, that very few people in the world get the right to say I told you so, and say it successfully, and I think at least, you know, your earlier warnings were probably ones that should have been heeded. And again, we are not blaming anybody right now because this was done sometime ago; not blaming the State, the Federal Government, Waste Management, or anybody else. It shows the importance of having an adequate independent, scientific base, and we apparently did not have that base back at the time this site was implemented.

I would like to ask Mr. Wilson—you make a very strong accusation in the first page of your statement. You talk about your knowledge of the situation and that the facility is based on an independent field investigation done under your supervision in 1980. The investigation was done at the request of the attorney general, and local residents got involved in the question of the validity of the design geotechnical report in support of the application to expand the site, was very close to being approved by the then-secretary of department of health and environment on the advice of his staff, mainly the deputy director of the division of environment.

Our studies confirm that the local people were indeed correct, and the geotechnical report appeared to have been intentionally falsified.

Now, I want to know by whom and in what way was this report falsified.

Mr. WILSON. The report was written by a civil engineering professor from Oklahoma State University. He drilled, I think, about five holes on the site. He stated that there was one well on the site and that it was dry. He said he found water in one hole at the extreme southeast corner of the site and that it was a discontinuous lens of limestone. The reason he reported that, in my opinion, was the fact that the district geologist for the Kansas Department of Health and Environment happened to stop by and saw mud being augered to the surface.

When we were asked to do the report, or do the investigation, the first thing I did when I got on the site was to measure the well that he had said was dry. He couldn't ignore it because it had a windmill on it. It had water at 45 feet.

We found there was another, from a concrete box 100 feet from that one, which also had water in it. It was a deep horizon well. There was another well out in the middle of the pasture with a pump in it and a tree growing out of it. It had water at 45 feet.

We drilled within probably 10 feet of all of these test holes which he said were dry and they were drilled below the elevation of ours, and we found water in all of them but one at an elevation 1,345 feet.

Now, there is no way that you could miss that water. It augurs to the surface on augurs as a thin tan mud. Now, he also—it was reported by—Tony Harvey did the same thing in Oklahoma at a site down there, did not report water. And when the water wells—when he was asked why, he said "The people wouldn't let me on the land, so I didn't consider it relevant."

Mr. GLICKMAN. Now, for whom was that geotechnical report done?

Mr. **Wilson**. For, at that time, KIES, now NIES.

Mr. **Glickman**. Pardon?

Mr. **Wilson**. Now NIES. KIES, which is now National Industrial Environmental Services.

Mr. **Glickman**. I mean, it was for the operator of the facility?

Mr. **Wilson**. Yes; they were proposing to expand to the 80 acres to the south.

Mr. **Glickman**. And who was the operator of the facility at the time the report was done?

Mr. **Wilson**. KIES, I believe. I am sure it was. Yes; because it was done in 1979.

Mr. **Glickman**. What I am trying to find out, was that done before the current operators of the facility came in?

Mr. **Wilson**. Yes.

Mr. **Glickman**. All through this hearing we have been hearing about the vulnerability of the process to lack of a carefully controlled, positive, constructive public policy to prevent this type of thing from happening, and there does seem to be some sloppiness, and it may be gross negligence or willful altering of documents, but I am not even going to take it that far. I have no independent knowledge.

I am just saying when you are talking about potential hazards to peoples' lives, particularly with the level of contamination, it is very minuscule, because the kind of damage it does, it is disturbing to see the lack of scientific structuring of information, which is a problem I am sure you agree with.

Mr. **Wilson**. I find it very difficult to understand why the Department of Health and Environment, which has an excellent staff of engineering geologists, why they were not asked to review that report. I think the district geologist did, but the point is, that thing was very close, I think, to being approved, and it might never have been checked.

Mr. **Glickman**. OK, thank you.

I want to thank you all for your testimony today. It has been quite productive and you have summed it up, in at least a scientific point of view, quite carefully.

Mr. **Wilson**. Mr. Glickman, may I show you two diagrams which have some very recent information on it?

Mr. **Glickman**. Let me ask you something. Even though the report was done for a private person, it was—its use was for a public purpose to get, I guess, a landfill permit, and it again shows how important it is for the public to be protected all the way through this process.

Why don't you go ahead now. Turn it around. It looks like a Soviet document until you get it the right way.

Mr. **Wilson**. Friday before last—I had not plotted up Lee Deets' information previously, so I went in there to check to see just exactly what that was. The reason I hadn't plotted it was he didn't have any top elevation, so I had to interpolate those off the site geotechnical, or the site map.

Now, this is a cross section from the report prepared by Woodward-Clyde. You can see very clearly here that the trench or the E-ponds were cut down, indeed, very close to and probably a little bit into the upper A horizon. Now, you note that in this model it is a discontinuous zone and all of their testing has been done out there since then, all of the holes only extend down to about 1,345 feet. In other words, there has been no testing between, down into the area between the lower B horizon and the A horizon.

Now, I have drilled—their contention is that that zone is gone and, therefore, it is just a lens that swoops off to the north. Now, I have contended for a long time, because of my experience as an engineering geologist, that where you have a water-bearing zone like that, even if there is not dip there and even if it is dissolved away, that the water that is carried into it, some of it anyhow, moves on down parallel to the surface of the ground, along the unweathered contact of the shale, and I have requested at various times that they test to see whether or not that continued beyond what they think is a discontinuous zone. I think we are stuck with a bad waterline.

I went in and found Lee Deets' hole, and this is test hole 7. It is now monitoring well No. 5. A note on his log says, a small lentil of water at 24 feet making about 1 gallon per minute, and then at 28 feet a zone of water making about 5 gallons per minute.

Now, that is exactly what we got in our pumping tests on the A horizon and the B horizon on the proposed site. So I contend that that zone does drop down and the Z horizon is present, from monitoring well No. 9, that slumped a little bit, but it was nothing we need to worry about.

Here is the location of that well, right there. It is 220 feet south of the north line, about 200 feet east—or west of the east line, and it is right in that little intermittent tributary that goes down to Prairie Creek.

Now, if the A horizon is there, and I am certain it is, it is contaminated; and if it is contaminated that far, then it is probably moved offsite.

Mr. GLICKMAN. Which way?

Mr. WILSON. Probably moved northeast along that tributary and came out of the spring down by Prairie Creek. Now, there are two wells over in the corner of the section that doesn't show, the Hopkins' wells that have been—have shown contamination from early on, but which have been explained away by Mel Gray as saying it was something in the hose that they used to get the samples. So this is my most recent evidence.

Now, another stupid thing in my opinion that was done, was the leachate from the intersection trenches was taken out of that and put into E-2. Now, why was that approved by the Health and Environment? I do not understand, because they know that it is in contact with the A horizon and the trenches that they have installed out there only extend over part way across the E-2 pond.

Now, these leachates, most of them are denser than water so they will eventually sink to the bottom of the pond and go out through that permeable horizon, in my opinion, and that apparently is true because since they have been doing that process, the pollution for the contaminant level up here in spring 6 has increased.

Thank you.

Mr. GLICKMAN. Thank you very much.

I think that our time has basically run for the course of the hearing. I would just make a couple of comments. One is that I think that this has been an extraordinarily profitable hearing. In the first place, this is the first one the committee has conducted anywhere except the coasts or the east or the west coasts of the United States, and there are a lot of typical geological patterns that may affect millions of people who live in this part of the country.

No. 1, we recognize that for this society to be productive, we will be producing hazardous materials and that is just a function of a modern industrialized society, and we have to provide ourselves answers as to how they are disposed of, and are there better alternatives. And I think this will be useful, not only to us but whoever holds the State investigations; Norma Daniels and Ben Foster as well as Barbara Sabol of the State, and EPA as well.

Third of all today, there have been some implied and expressed statements of wrongdoing, and I would say that I intend, and I am sure the committee does intend to investigate those further, and if we find that there is anything there that ought to be referred to the U.S. Attorney or to the Attorney General, Mr. Stephens, or perhaps to professional societies to review that information, because when you were talking about hazardous wastes which could affect, from a health way, causing of cancer or other disease in people way down the line, there is no excuse for that kind of wrongdoing, and I think the committee will review those from the standpoint of the Furley perspective.

I would like to, before I turn the microphone back to the chairman, I would say that there are many people who have asked to have statements included in the record, and without objection, those statements by several groups of citizens will be included in the record, and the record will be held open for 10 days for anybody who may wish to submit statements for the record.

So, now I will turn the hearing back to the chairman.

Mr. SCHEUER. I want to thank all the participants in this hearing for their extremely valuable testimony. It has been very impressive to me, very helpful to the committee, and we are very grateful for the fact that you all came out to testify, and especially on a Saturday morning, taking the time away from your family and friends.

I also want to thank Congressman Glickman for taking the time to make the arrangements for this hearing and for his exceptionally fine work on the—on the Science and Technology Committee where he does play a leading role as chairman of one of the leading—of one of the most important committees, and where he has worked very closely with me.

We intend to move together, together on a matter that we have heard testimony on this morning, and I am going to continue to rely on his high intelligence and his outstanding leadership.

I congratulate this community on having sent a representative to Washington of his outstanding quality. We don't have many of them, and I hope that you will keep him there for a long, long time.

I thank you for your terrifically useful and productive testimony.

Meeting is adjourned.

[Whereupon, the subcommittee was adjourned.]

APPENDIX

ADDITIONAL MATERIAL SUBMITTED FOR THE RECORD

Charter

Meeting on Furley Hazardous Waste Landfill

Subcommittee on Natural Resources,
Agriculture Research and Environment
of the
Committee on Science and Technology

July 30, 1983; 9:00 a.m.
City Library Auditorium
223 South Main Street, Wichita, Kansas

I. OBJECTIVES OF THE MEETING

1. To examine the extent of environmental contamination caused by hazardous wastes from the Furley landfill.
2. To explore the monitoring, studies, and research needed to ameliorate or reverse the environmental contamination.
3. To review the actions necessary to prevent future environmental contamination by hazardous waste landfills.

II. JURISDICTION

The Subcommittee has jurisdiction under Rule X of the U.S. House of Representatives for "Environmental research and development" and for special oversight functions. This is further defined by the Committee on Science and Technology to include, "...legislation, risk assessment and other matters relating to environmental research and development generally--including, but not limited to, research and development activities of the Environmental Protection Agency...."

Since the 97th Congress, the Subcommittee has held several hearings that had as a primary focus hazardous waste management. Three of these were field hearings that have been held in the 98th Congress.

III. BACKGROUND

The Environmental Protection Agency has estimated that the State of Kansas generates 350,000 tons of hazardous wastes annually. The total estimated for all states is 41 million tons.

A March 1983 report issued by the Office of Technology Assessment on "Technologies and Management Strategies for Hazardous Waste Control" evaluated the extent of hazardous waste mismanagement. The report stated that, "In the past, most hazardous wastes have been land disposed (as much as 80 percent) and, according to EPA estimates, 90 percent of these were probably mismanaged."

IV. FURLEY HAZARDOUS WASTE LANDFILL

The Furley hazardous waste landfill, owned by Chemical Waste Management, was opened in 1977. Wastes dumped included mercury, paraquat, gasoline, metals, vinyl chloride, methylene chloride and others. In 1980 the owners proposed expansion of the site. However, due to pressure brought by citizens concerned with environmental contamination, the Kansas Attorney General ordered independent tests on the landfill site.

These tests indicated that some contamination of groundwater had occurred. As a result of this information the Governor of Kansas ordered the Furley landfill closed in January 1982.

Since the closing of the landfill, controversy has centered around the issues of what are the best technologies to ameliorate the existing environmental contamination and how to prevent additional contamination in the future. On the other hand, another issue involves the owners of the landfill, Waste Management, Inc., who have proposed reopening and expanding the site.

V. MEETING

The field meeting will examine the current scientific data regarding the environmental contamination that has resulted from the hazardous waste landfill. Additionally, the meeting will explore what are the future actions necessary to prevent further contamination. Witnesses who have been invited to testify include representatives from the Environmental Protection Agency, the Kansas Department of Health and Environment, the Kansas Geological Survey, the Wichita-Sedgwick County Health Department, Waste Management, Inc., local citizens and others.

The South Wind
Sierra Club

July 30,1983

Congressman Glickman:

I represent 500 members of the South Wind Group of the Sierra Club. We have watched with fear and anger as hazardous waste dumps around the country have failed. We've all heard of Love Canal, the "Valley Of The Drums" in Kentucky, and now on a smaller scale we have Furley.

Before the hazardous waste landfill at Furley opened it was heralded as a state of the art facility that could safely contain industrial wastes for the hundreds of years that some may remain toxic to the environment.

Waste Management, Inc., the operators of Furley have not made good on their promise to the public to provide a safe, secure landfill for disposing of and containing hazardous wastes over a long period of time.

In fact, after only a few short years the landfill is leaking toxic wastes like a giant sieve into underground water systems and endangering the publics health.

(cont.)

"Not blind opposition to progress, but opposition to blind progress."

After numerous incidents such as this around the country it has become clear to Sierra Club members in the Wichita area that there is no such thing as a safe, secure hazardous waste landfill. It is also very clear that it is now time to clean Furley up, close it down for good and start looking at some safe, realistic means of managing hazardous wastes.

There are some alternatives to landfilling hazardous wastes. We can encourage industry to find ways to reduce the amount of wastes they generate. Some wastes could be purified and recycled; we could also study the system that the government of Denmark employs to dispose of its' hazardous waste.

The Danes have set up a non-profit government-controlled waste disposal system called Komunikem. It consists of a group of regional collection centers connected to a centralized disposal facility which uses high-temperature incinerators and solidification to handle hazardous wastes. Their methods have been proven to be safe, effective and have the support of industry.

In closing I would just say that we cannot afford to keep our heads in the sand any longer on this issue; we know now what might be down there.

sincerely,
Michael R. Moore
Michael R. Moore
Chair, South Wind
Group of the Sierra Club

lwvk
league of women voters of kansas

July 31, 1983

The Honorable James H. Scheuer
House of Representatives
Washington, D. C. 20515

RE: Public Hearing on July 30,
1983 concerning the NIES
Hazardous Waste Facility
at Furley, Kansas

Dear Mr. Scheuer:

Since I was unable to attend the hearing on Saturday, I would like to share with you though this letter some of the ideas of the League of Women Voters of Kansas with regard to the management of hazardous wastes in Kansas. Members of the League completed a two-year study of state hazardous waste management this past winter and adopted our consensus in April 1983.

To protect the health of the people of Kansas and to prevent the degradation of the land, water and air of the State, the League believes that a program to reduce, detoxify and safely dispose of hazardous wastes is essential. Control of hazardous wastes and the compliance with laws and regulations can be achieved only through the concerted efforts of all levels of government, the generators of wastes, the hazardous waste management industry, and the general public as consumers and users of products and services.

The League holds state government principally accountable for insuring that safe and proper procedures are followed by generators, transporters, and those who treat or dispose of hazardous wastes in Kansas. Also, we support the concept of the state's participation in a hazardous waste interstate compact to enable Kansas and its neighboring states to share in the management of such wastes and to assure that the most feasible and suitable procedures are utilized within each state.

The League advocates that the policies and programs of Kansas should address and approve usage of the following management options in this order of preference:

1) elimination or reduction of wastes
2) recovery of materials and/or of energy
3) treatment by chemical, biological, physical or thermal procedures
4) separation and concentration of wastes for better reuse, treatment or disposal
5) exchange of wastes for use as materials in production or manufacturing processes
6) disposal of wastes by land burial.

The use of underground injection wells for disposal of hazardous wastes is not acceptable to the members of the League.

During the study of hazardous waste management in Kansas, League members discussed the pro's and con's of a waste facility within the state and attempted to understand the problems of the NIES facility at Furley, In spite of all efforts, members were unable to reach consensus on specific recommendations for the future of the NIES facility. They agreed only on support of measures for a rapid and as-complete-as-possible cleanup of the contaminated groundwater.

We appreciate Representative Dan Glickman's and your holding a public hearing in Wichita and the interest of the Subcommittee in this important issue of hazardous waste management. The League believes that federal direction is needed in the development of alternatives to on-site and off-site disposal of hazardous wastes by land burial and in the development of a defensible procedure to determine a "safe" quantity of a particular waste for on-site storage.

Thank you for your interest in the concerns of Kansas citizens.

Sincerely yours,

Nancy Scott
Nancy Scott, President
Mary Ann Bradford
Mary Ann Bradford,
Natural Resources Coordinator
1809 Webster Avenue
Topeka, KS 66604

C - Rep. Dan Glickman
Rep. Larry Winn

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VII
324 EAST ELEVENTH STREET
KANSAS CITY, MISSOURI - 64106

NOV 2 1983

OFFICE OF
THE REGIONAL ADMINISTRATOR

Honorable James Scheuer
Chairman, Subcommittee on Natural Resources
Agriculture Research and Environment
U.S. House of Representatives
Washington, D.C. 20515

Dear Mr. Scheuer:

I regret that the information and documents we provided to you in my October 17, 1983, letter did not answer the questions you have about testing at the NIES site near Furley, Kansas.

Over the last three or four years, we have released to private citizens copies of almost everything in our files. We estimate it would take approximately 40 hours to copy these materials with several additional hours required to assemble the information and then return it to the files. If you wish us to furnish this information and data to you, please let me know. As an interim step and in the interest of answering your specific questions by November 7 as you requested, we have compiled the enclosed tables.

You will note that some of the results are shown as non-detectable at a given detection limit. Others are reported as less than the given detection limit. These two methods of reporting sample results mean the same thing. It is merely the way the individual analyst recorded the results. Detection limits are determined by using standard EPA methodology which achieves state of the art detection limits. If trichlorophenol, a dioxin precursor, is noted in a sample scan for organics, the detection limit is lowered to determine if dioxin is present in that sample. I believe the information in these tables will answer your questions one (1) through four (4). Maps of the site and the surrounding area are enclosed for reference.

Please accept my apology for sending you these handwritten materials but we were unable to get them typed in time to meet your deadline.

Questions five (5) and six (6).

When an analysis for 2,4,5-TCP is requested, our laboratory uses specific 2,4,5-TCP standards to quantify the concentration. When only a scan of a sample is requested for all organic compounds the analyst notes which compounds are present and provides a rough estimate of the concentration. If 2,4,5-TCP is noted, our laboratory attempts a better quantification than this rough estimate by using a 2,4,6-TCP standard. The 2,4,6-TCP standard is readily available since it, and not 2,4,5-TCP, is one of the priority pollutants commonly run by our laboratory.

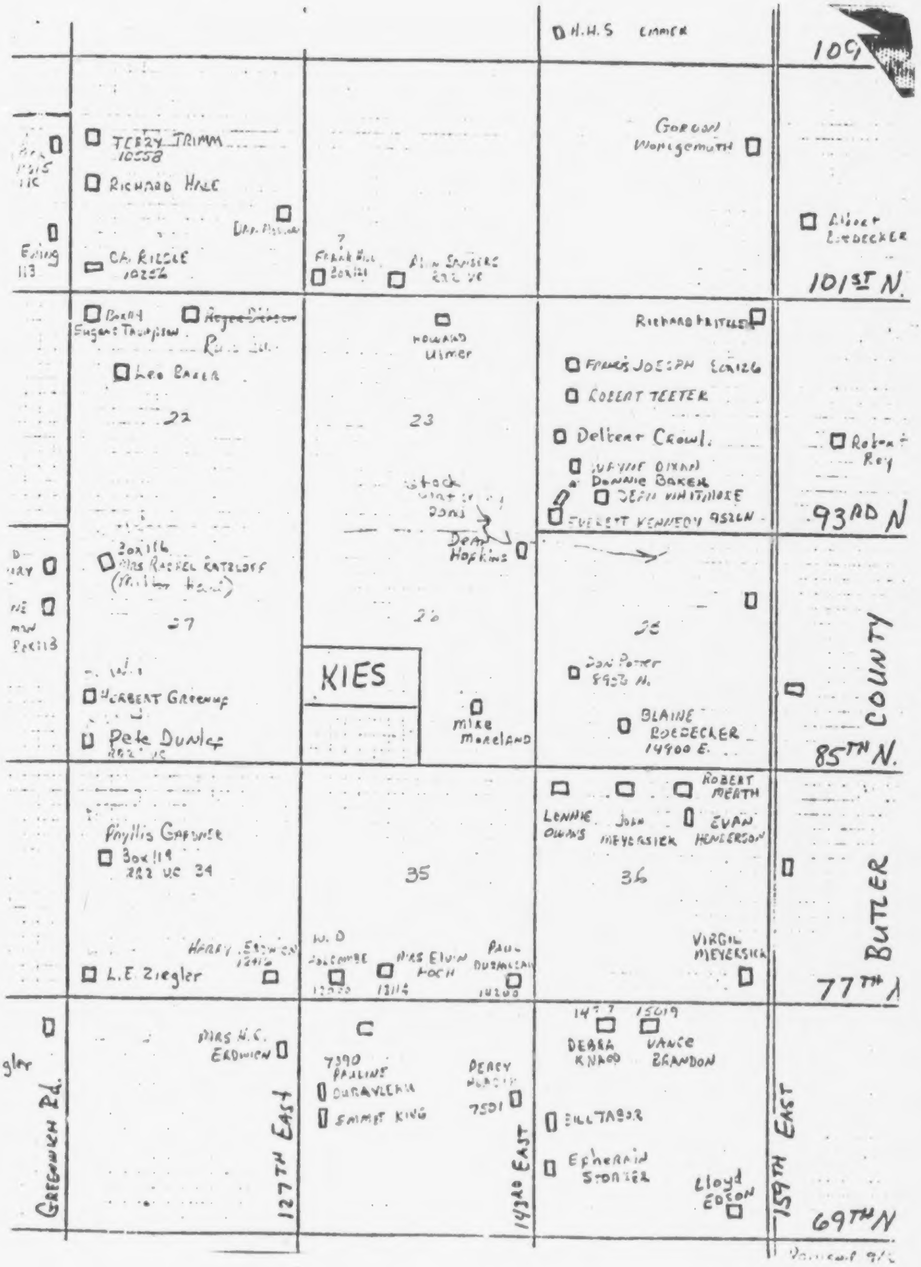
As you know, a preliminary laboratory analysis indicated the presence of dioxin at a level of 1.79 parts per billion (ppb) in a sample collected from Well #220. Dioxin was non-detectable at the 1 ppb detection limit in the other wells which were sampled. I am unable to confirm these results at this time because Wright State Laboratory has not furnished us with a report of the final results of the tests.

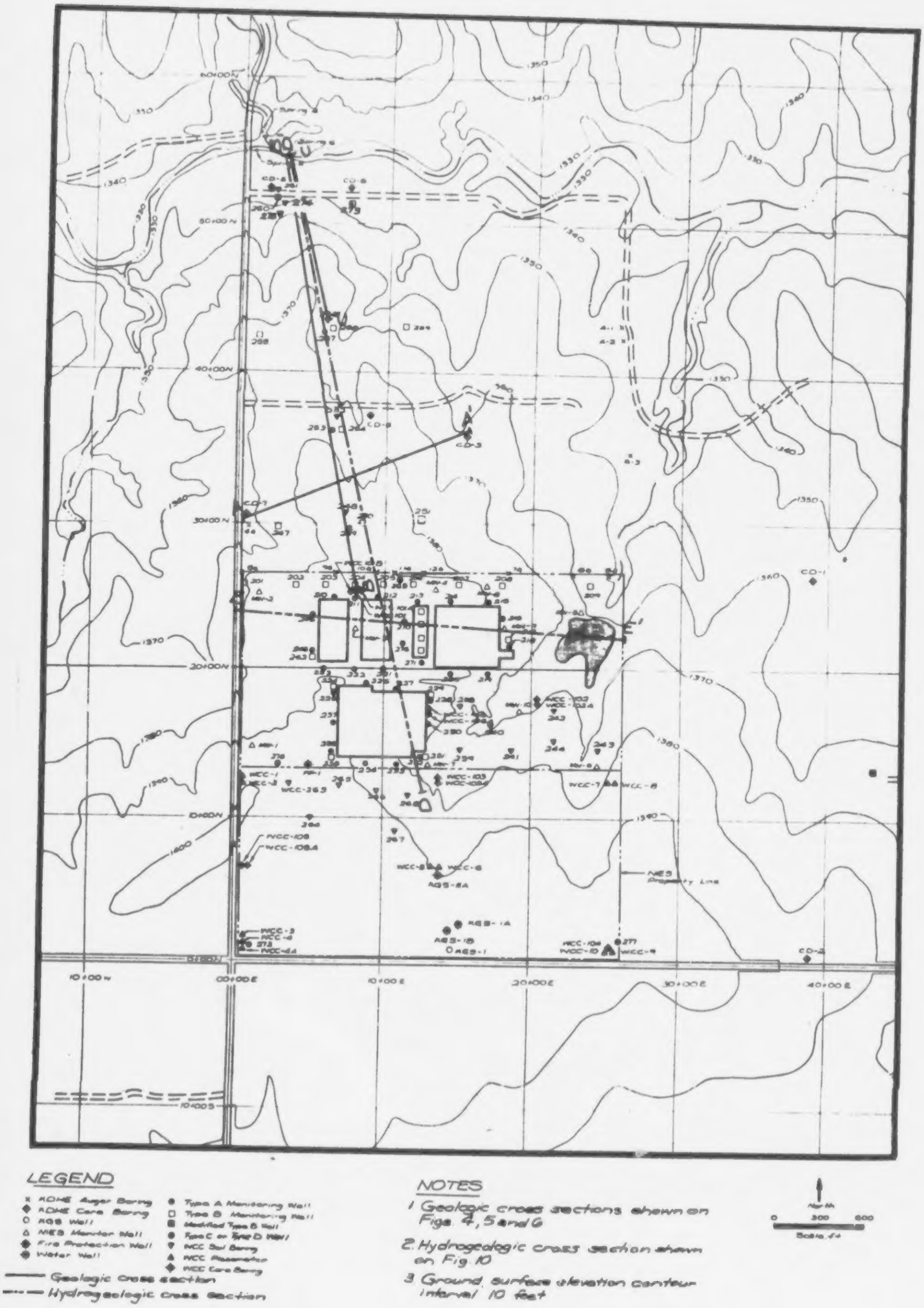
If you have any questions or need additional information, please contact us. The member of my staff most familiar with the NIES site is Robert Stewart. He can be reached at (816) 374-6531, FTS 758-6531.

Sincerely yours,

Morris Kay
Regional Administrator

Enclosures


H.H.S
109
Terry Trimm 10558
Richard Hale
C.H. Riegle 10256
Frank Bill Schick
Gordon Wohlgemuth
Albert Roedecker
101st N.
Eugene Thompson
Leo Baker
22
Howard Ulmer
23
Richard Fritzler
Francis Joseph Schick
Robert Teeter
Delbert Crowl
Wayne Dixon
Donnie Baker
Everett Kennedy 9526N
Robert Rey
93RD N
Stock watering pond
Dean Hopkins
Box 116 Mrs Rachel Ratzlaff
27
26
25
KIES
Herbert Greenup
Pete Dunlap
Mike Moreland
Don Potter 8953 N.
Blaine Roedecker 14900 E.
85TH N.
BUTLER COUNTY
Phyllis Gardner Box 119
35
Robert Merth
Lennie Owens
John Meyersiek
Evan Henderson
36
Harry Erdwien
L.E. Ziegler
Holcombe
Mrs Elvin Koch
Paul
Virgil Meyersiek
77TH
Mrs H.C. Erdwien
7390 Pauline Duravlecka
Emmet King
Percy 7501
Debra Knapp
Vance Brandon
Bill Tabor
Ephraim Stonier
Lloyd Edson
Greenwich Rd.
127TH East
143RD East
159TH East
69TH N


60+00N
50+00N
40+00N
30+00N
20+00N
10+00N
10+00S
10+00W
00+00E
10+00E
20+00E
30+00E
40+00E
1330
1340
1350
1360
1370
1380
CD-1
CD-2
CD-3
CD-5
CD-6
CD-7
CD-8
WCC-1
WCC-2
WCC-3
WCC-4
WCC-4A
WCC-6
WCC-7
WCC-8
WCC-9
WCC-10
WCC-102
WCC-102A
WCC-103
WCC-103A
WCC-104
WCC-108
WCC-108A
AGS-1
AGS-1A
AGS-1B
AGS-8A
NIES Property Line
LEGEND
KDHE Auger Boring
KDHE Core Boring
AGS Well
NIES Monitor Well
Fire Protection Well
Water Well
Type A Monitoring Well
Type B Monitoring Well
Modified Type B Well
Type C or Type D Well
WCC Soil Boring
WCC Piezometer
WCC Core Boring
Geologic cross section
Hydrogeologic cross section
North
0
300
600
Scale, ft

NOTES

1. Geologic cross sections shown on Figs. 4, 5 and 6
2. Hydrogeologic cross section shown on Fig. 10
3. Ground surface elevation contour interval 10 feet

CROSS SECTION LOCATION MAP

April 1982, 81C246C, WCC

Fig. 3

Dioxin
2,3,7,8 TCDD

ND = Not Detected

Area Tested	Date	Sampled by	Analyzed by	Results	Detection Limit	Sample #
Well #2	9/17/80	EPA	EPA	ND	< 5 ug/l	AN22A02 - Lab G0125
Control Point #3				ND	< 5 ug/l	AN22A03 - Lab G0126
Well #6					< 5 ug/l	AN22A04 - Lab G0127
Well #7						AN22A05 - Lab G0128
Well #8						AN22A06 - Lab G0129
Well #10						AN22A07 - Lab G0130
[illegible]						~~AN22A09 - Lab G0131~~
Sanitary Well	9/17/80	EPA	EPA	ND	< 5 ug/l	AN22B03 - Lab G0132

Dioxin (2,3,7,8 - TCDD)

ND = Not Detected

Area Tested	Date	Sampled by	Analyzed By	Results	Detection Limit	Sample #
1 - Slot Trench East Well	8/6/82	KDHE	EPA	< 10.0 ug/l	10 ug/l	AC 3801
NIES	1/20/82	KDHE	EPA	< .100 ug/l	.1 ~~100~~ [illegible] ug/l	AC 2201
#3 monitoring well	9/6/79	KDHE & EPA	EPA - Reg 7	< 0.1 ug/l	.1 ug/l	AK0101
#7 monitoring well				< 0.1 ug/l	↓ ug/l	AK0102
Sanitary Water Supply Well				< 0.1 ug/l	ug/l	AK0103
Drainage Containment Pond - NW of Dike				< 0.1 ug/l	ug/l	AK0104

~~[illegible]~~ ~~[illegible]~~ arsenic & for chlordane)

(2,3,7,8-TCDD) * Not Detected = ND

area tested	date	sampled by	analyzed by	results	detection limit	sample #
well 220	3-12-82	KDHE	EPA	<10 ng/l	10 ng/l	AC 2801
Spring 6	4/8/82	KDHE	EPA	* ND	< 10 ug/l	AC 3001
C 269	4/8/82	KDHE	EPA	ND	< 10 ug/l	AC 3002
D 278	4/8/82	KDHE	EPA	ND	< 10 ug/l	AC 3003
PCSP0.5	4/8/82	KDHE	EPA	ND	< 10 ug/l	AC 3004
PCSPI	4/8/82	KDHE	EPA	ND	< 10 ug/l	AC 3005
3	2/17/82	KDHE	EPA	< 0.1 ug/l	[illegible] .1 ug/l	AC 2500
17	2/17/82	KDHE	EPA	< 2.0 ug/l	2 ug/l	AC 2501
13	2/17/82	KDHE	EPA	< 2.0 ug/l	ug/l	AC 2502
12	2/17/82	KDHE	EPA	< 2.0 ug/l	↓ ug/l	AC 2503
8	2/17/82	KDHE	EPA	< 0.5 ug/l	.5 ~~10~~ ug/l	AC 2504

Dioxin
(2,3,7,8 - TCDD)

ND = Not Detected

Area Tested	Date	Sampled by	Analyzed by	Results	Detection Limit	Sample #
7	2/17/82	KDHE	EPA	< 0.5 ug/l	.5 ug/l	AC 2505
6	2/17/82	KDHE	EPA	< 0.5 ug/l	.5 ug/l	AC 2506
5	1/20/82	KDHE	EPA	< 0.1 ug/l	.1 PG/ul	AC 2201
3B-II	2/26/82	KDHE	EPA	< 0.1 ug/l	.1 ug/l	AC 2700
[illegible] 6	[illegible]	[illegible]	[illegible]	—	—	[illegible]
[illegible]	[illegible]	—	—	—	—	[illegible]
#13	2/22/82	KDHE	EPA JTC Lab	ND	<0.1 ug/l	AC 2601
Harvey RWD #1	2/22/82	KDHE	EPA JTC Lab	ND	<0.1 ug/l	AC 2602
#15	2/22/82	KDHE	EPA JTC Lab	ND	<0.1 ug/l	AC 2603
#11	2/22/82	KDHE	EPA JTC Lab	ND	<0.1 ug/l	AC 2604
#10	2/22/82	KDHE	EPA JTC Lab	ND	<0.1 ug/l	AC 2605
Dean Hopkins Stock Well	2/22/82	KDHE	EPA JTC Lab	ND	<0.1 ug/l	AC 2606
#14	2/22/82	KDHE	EPA JTC Lab	ND	<0.1 ug/l	AC 2607
#12	2/22/82	KDHE	EPA JTC Lab	ND	<0.1 ug/l	AC 2608

Arsenic = As

Area Tested	Date	Sampled by	Analyzed by	Results	Detection Limit	Sample #
Well # 201 B	3/28/83	NIES Woodward-Clyde Consultants	Wilson Labs Salina, Kansas	11 ug/l	.1 ug/l	231 A
209 B	3/28/83			.54		232 A
235 B	3/29/83			.95		233 A
260 B	3/30/83			ND		234 A
258 B	3/30/83			.3		235 A
257 A	3/30/83			.4		236 A
255 B	3/30/83			8.5		237 A
272 A	3/30/83			0.2		238 A
E-2 Composite	3/31/83			300		239 A
E-1 Composite	3/31/83			15		240 A
Well # Storm Water Retention Pond	4/1/83			.1		241 A
" "	4/5/83			.1		241 B
Well # 207 B	4/6/83			.3		242
273 B	4/6/83			.3		243
226 A	4/6/83			1.4	.1 ug/l	244

Arsenic = As

rea Tested	Date	Sampled by	Analyzed by	Results	Detection Limit	Sample #
254 B	4/6/83	NIES Woodward-Clyde Consultants	Wilson Labs. Salina, KS.	.1 ug/l	.1 ug/l	245
270 A	4/7/83			1.3 ug/l		246
277 A	4/7/83			.2 ug/l		247
227 A	4/7/83			8.2 ug/l		248
221 A	4/7/83			1.7 ug/l		249
orth Drainage Trench	4/7/83			1.7 ug/l		250
South Drainage Trench	4/8/83			2.6		251
204 B	4/12/83			.2		252
282 A	4/12/83			1.8		253
210 A	4/12/83			ND		254
211 A	4/12/83			0.4		255
isposal Cell No. 1	4/13/83			0.2		565
232 A	4/13/83			0.51		257
276 A	4/13/83			0.1		258
279 A	4/13/83			1.5 ug/l	.1 ug/l	259

ND = Not Detected

Arsenic = As

Area Tested	Date	Sampled by	Analyzed by	Results	Detection Limit	Sample #
Well # 218 A	4/15/83	NIES' Woodward-Clyde Consultants	Wilson Labs, Salina KS	ND	.1 ug/l	261
219.A	4/15/83			.1 ug/l		262
229 B	4/18/83			1.5		263
206 B	4/18/83			1.4		264
208 B	4/18/83			.3		265
251 B	4/19/83			.73		266
250 B	4/19/83			.2		267
247 B	4/19/83			ND		268
302 B	4/19/83			1.9	.1 ug/l	269
Well # 231 B	4/19/83			.5	.1 ug/l	271
249 A	4/20/83			31		272
216 A	4/20/83			.53		273
205 B	4/20/83			1.6		274
228 A	4/20/83			27		275
212 A	4/20/83			2.6	.1ug/l	276

Arsenic = As

NT - Not Tested

Area Tested	Date	Sampled by	Analyzed by	Results	Detection Limit	Sample #
283 A	4/21/83	NIES Woodward-Clyde Consultants	Wilson Labs, Salina, KS	NT	.1 ug/l	277
213 A	4/21/83			1.1 ug/l		278
284 A	4/21/83			1.3 ug/l		~~28~~ 279
269 C	4/21/83			.73		280
278 D	4/21/83			1.2		281
220 A	4/21/83			130		282
233 A	4/22/83			.62		283
271 R A	4/22/83			23		284
217 B	5/3/83			1.4		285
225 A	5/4/83			38		286
222 A	5/4/83			5.3		287
230 A	5/4/83			0.5		288
224 B	5/4/83			1.9		289
262 B	5/4/83			2.6		290
203 B	5/4/83			2.2	.1 ug/l	291
Wichita Tap Water	5/15/83			1.5	.1 ug/l	309

Arsenic – As

NT = Not Tes

NR =

ND = Not Detected

Area Tested	Date	Sampled by	Analyzed by	Results	Detection Limit	Sample #
Well No. 230	3/19/82	Woodward Clyde Consultants	Wilson Labs, Salina, KS	0.78 ug/l	.1 ug/l	47
262	3/19/82			1.9		52
202	3/23/82			NT		63
Surf. E-2	3/26/82			630		79
E-2 7 feet	3/26/82			310		80
E-2 3-5 feet	3/26/82			170		81
270 A	3/30/82			NT		82
271 R A	3/30/82			NT		83
276	3/30/82			NT		84
269	3/30/82			NT		86
277	3/30/82			NT		87
273	3/30/82			NT		88
E-1 Surf.	3/31/82			NR		89
E-1 14 feet	3/31/82			NR		90
272 A	3/31/82			ND		92
278 D	4/5/82			1.3 ug/l		101

Arsenic = As

Area Tested	Date	Sampled by	Analyzed by	Results	Detection Limit	Sample #
Well No. 229 B	3/12/82	Woodward Clyde Consultants	Wilson Labs. Salina, Kansas	4.9 ug/l	.1 ug/l	31
254B	3/15/82			2.8		32
258B	3/15/82			2.3		33
207 B	3/15/82			1.4		34
211 A	3/16/82			0.64		35
222 A	3/16/82			10		36
250 B	3/17/82			1.9		37
210 A	3/16/82			1.7		38
259 B	3/16/82			2.5		39
247 B	3/17/82			0.95		40
201 B	3/17/82			20		41
231 B	3/18/82			2.5		42
251 B	3/18/82			3.7		43
255 B	3/18/82			9.3		44
235 B	3/18/82			0.92		45

Arsenic = As

Area Tested	Date	Sampled by	Analyzed by	Results	Detection Limit	Sample #
Distilled Water	3/8/82	Woodward Clyde Consultants	Wilson Labs Salina, Kansas	23 ug/l	.1 ug/l	15
Tank Truck at Spigot	3/8/82			1.7 ug/l		16
Acetone	3/8/82			ND ug/l		17
Tank truck (at steam cleaner nozzle)	3/8/82			2.4 ug/l		18
224 B	3/10/82			4 ug/l		19
225 A	3/10/82			39 ug/l		20
226 A	3/10/82			3.4		21
227 A	3/11/82			6.3		22
204 B	3/11/82			2.2		23
205 B	3/11/82			6.7		24
217 B	3/11/82			13		25
228 A	3/11/82			27		26
232 A	3/12/82			2		27
220 A	3/12/82			14		28
249 A	3/12/82			10		29
203 B	3/12/82			16		30

Arsenic = As

Area Tested	Date	Sampled by	Analyzed by	Results	Detection Limit	Sample #
Well 221 A	2/25/82	Woodward Clyde Consultants	WMI Tech Center Riverdale, Illinois	199 ug/l	.1 ug/l	1 *
212 A	2/25/82		WMI Tech Center Riverdale, Illinois	139	.1 ug/l	2 *
No. Bndary 209 B	3/3/82			87		3 *
210 A	3/4/82			ND		4 *
211 A	3/3/82			7		5 *
No. Boundary 206 B	3/3/82			ND		6 *
No. Boundary 207 B	3/3/82			ND		7 *
No. Boundary 208 B	3/3/82			ND		8 *
260 B_{Mod}	3/3/82			ND		9 *
212 A	3/5/82		Wilson Labs, Salina, Kansas	4.2		10
221 A	3/5/82			21		11
213 A	3/5/82			15		12
249 A	3/5/82			9.4		13
[illegible]	[illegible]					

Arsenic = As

Area Tested	Date	Sampled by	Analyzed by	Results	Detection Limit	Sample #
Lagoon E-2	12/3/79	KOHE & NIES	KOHE & NIES	.250 mg/l	.005 mg/l	KIES records
	6/2/80			.01		
	12/16/80			<.25	.25	
	4/21/81			.17		

Arsenic = As

Area Tested	Date	Sampled by	Analyzed by	Results	Detection Limit	Sample #
Main Drainage Pond	12/8/78	KOHE & NIES	KOHE & NIES	< .001 mg/l	.001 mg/l	KIES records
	6/8/79			< .001	.001	
	12/3/79			.084		
	9/17/80			.00		
	4/21/81			< .01	.01	
Lagoon E-1	12/2/77			< .001		
	6/5/78			< .001		
	5/31/79			< .001		
	12/3/79			.330		
	6/2/80			.05		
	12/16/80			< .25	.25	
	4/21/81			.03		
Lagoon E-2	6/5/78			.005		
	12/8/78			.046		
	5/31/79			< .001		

Arsenic = As

Area Tested	Date	Sampled by	Analyzed by	Results	Detection Limit	Sample #
Well No. 6	9/17/80	KDHE & NIES	KDHE & NIES	.01 mg/l	.001 mg/l	KIES records
	12/16/80			<.05 mg/l	.05	
Well No. 7	2/4/77			.048	.001	
	6/5/78			<.001		
	12/8/78			<.001		
	5/31/79			<.001		
	7/12/79			.00		
	12/31/79			.052		
	6/2/80			.005		
	9/17/80			.06		
	2/17/81			.12		
ater Supply Well	2/28/77			.0075		
	9/17/80			.01		
ain Drainage Pond	8/2/77			.015		
	2/6/78			.02		
	6/5/78			<.001		

** On KIES Monitoring Records

Arsenic = As

Area Tested	Date	Sampled by	Analyzed by	Results	Detection Limit	Sample #
Well No. 5	12/3/79	KDHE & NIES	KDHE & NIES ...	.058 mg/l	.001	KIES records
	6/2/80			<.005 mg/l	.005	
	9/17/80			.01 mg/l	.001	
	12/16/80			1.7	.001	
	4/21/81			<.01	.01	
Well No. 6	2/4/77			.04		
	6/25/77			.05		
	10/4/77			.039		
	6/5/78			<.003	.003	
	12/8/78			<.001	.001	
	5/31/79			<.001	.001	
	7/12/79			.00		
	12/3/79			.056		
	6/2/80			<.005	.005	

[illegible] Arsenic = AS

Area Tested	Date	Sampled by	Analyzed by	Results	Detection Limit	Sample #
Well No. 10	8/10/79	KOHE & NIES	KOHE & NIES	.004 mg/l	.001 mg/l	KIES records
	5/31/79			.02		
	12/3/79			.056		
	6/2/80			<.005	.005	
	9/17/80			.01		
	12/16/80			<.05	.05	
	4/21/81			<.01	.01	
Well No. 2	6/5/78			.021		
	12/3/79			.066		
	6/2/80			<.005	.005	
No. 5	2/4/77			.015		
	6/25/77			.05		
	10/4/77			<.001	.001	
	6/5/78			.011		
	12/8/78			<.001		
	5/31/79			<.001		
	7/12/79			.00 mg/l	mg/l	

** via NIES Monitoring Records

Arsenic = As

Area Tested	Date	Sampled by	Analyzed by	Results	Detection Limit	Sample #
Well #3 Control Point	6/5/78	** KDHE & NIES	** KDHE & NIES	.021 mg/l	.001 mg/l	KIES records
	12/8/78			.006 mg/l		
	5/31/79			<.001 mg/l		
	9/12/79			.00 mg/l		
	12/3/79			.14 mg/l		
	6/2/80			<.005 mg/l	.005	
	9/17/80			.01		
	12/16/80			<.05	.05	
	4/21/81			<.01	.01	
Well No. 8	79			.056		
	9/17/80			.01		
Well No. 9	4/10/79			.016		
	5/31/79			<.001		
	12/3/79			.056		
	6/2/80			<.005	.005	
	12/16/80			<.05		
	4/21/81			<.01	mg/l	

Arsenic = As

Area Tested	Date	Sampled by	Analyzed by	Results	Detection Limit	Sample #
~~[illegible]~~	~~9/17/80~~	~~EPA~~	~~EPA~~	~~[illegible] ug/l~~	~~ug/l~~	~~AN22A02~~
Control Point #3	9/17/80	EPA	EPA	242 ug/l	<50 ug/l	AN22A03
Well # 6	9/17/80	EPA	EPA	<50 ug/l	<50 ug/l	AN22A04
						~~AN22A05~~
Well #8	9/17/80	EPA	EPA	<50 ug/l	≤50 ug/l	AN22A06
Well # 10				<50 ug/l	<50 ug/l	AN22A07
Well # 5				255 ug/l	<50 ug/l	AN22A09
Sanitary Well				<50 ug/l	<50 ug/l	AN22B03
~~Well No. 3 Control Point~~	~~6/[illegible]/78~~	Old KIES Monitoring Records ~~(NIES)~~	~~NIES~~	~~<.021~~	~~mg/l~~	
	~~12/8/78~~			~~.006~~		
	~~5/31/79~~			~~<.001~~		
	~~9/12/79~~			~~.00~~		
	~~12/3/79~~			~~.14~~		
	~~6/2/80~~					

Arsenic = As

Area Tested	Date	Sampled by	Analyzed by	Results	Detection Limit	Sample #
#3 monitoring well	9/6/79	EPA/KDHE	EPA	< 50 ug/l	50 ug/l	AK 0101
#7 monitoring well	9/6/79	EPA/KDHE	EPA	< 50 ug/l	ug/l	AK 0102
Sanitary Water Supply	9/6/79			< 50 ug/l	ug/l	AK0103
Drainage Containment Pond - NW of Dike	9/6/79			< 50 ug/l	ug/l	AK0104
Well # 3	9/17/80	~~KDHE~~ REKindel	KDHE	.01 mg/l	.001 mg/l	03C
Well # 5	9/17/80			.01	mg/l	05C
# 6				.01	mg/l	06C
# 7				.06	mg/l	07C
# 8				.01	mg/l	08C
# 10				.01	mg/l	010C
Water Supply Tap				.01	mg/l	011C
Main Drainage Pond				.00	mg/l	012C
Prairie Creek				.03	mg/l	013C
Prairie Creek				.10	mg/l	014C
[illegible]						

Arsenic - As

Area Tested	Date	Sampled by	Analyzed by	Results	Detection Limit	Sample #
01 Moreland Well	10/09/81	EPA	EPA - Reg 7	< 5 ug/l	< 5 ug/l	AK 3601
02 Dean Hopkins Well	10/09/81			N/A [redacted]	N/A	AK 3602
03 Bodecker	10/09/81			<5 ug/l	<5 ug/l	AK 3603
04 Erdwein Yolcombe/Hooks Well	10/09/81			<5 ug/l	<5 ug/l	AK 3604
05 Paul Duranleau Well	10/9/81			<5 ug/l	<5 ug/l	AK 3605
06 Stock Well	10/9/81			<5 ug/l	<5 ug/l	AK 3606
07 Spring SE	10/9/81			<5 ug/l	<5 ug/l	AK 3607
08 Spring SW	10/9/81			<5 ug/l	<5 ug/l	AK 3608
09 Spring at Brock/Hopkins	10/9/81			<5 ug/l	<5 ug/l	AK 3609
10 Coy Burge Well	10/9/81			<5 ug/l	<5 ug/l	AK 3610
11 Potter Ros	10/9/81			<5 ug/l	<5 ug/l	AK 3611
12 EDB Nancy Wait	10/9/81			<5 ug/l	<5 ug/l	AK 3612
13 Service Well	10/9/81		—	<5 ug/l	<5 ug/l	AK 3613

N/A = no results expected

Arsenic - As

Area Tested	Date	Sampled by	Analyzed by	Results	Detection Limit	Sample #
Neis Water Supply Well #50	12/28/81	EPA	EPA Reg 7	<50 ug/l	<50 ug/l	AK 3650 ~~350~~
#51 - E-2	12/28/81	EPA	Reg 7	4.79	<50	AK 3651
#53 - E-1	12/28/81	EPA	Reg 7	123	<50	AK 3653
#54 Waite Well [illegible]	12/28/81	EPA	Reg 7	[illegible] <50 ug/l	<50	AK 3654
#55 Spring 6	12/28/81	EPA	Reg 7	<50 ug/l	<50 ug/l	AK 3655
#57 NEIS Water Well	12/28/81	EPA	Reg 7	<50 ug/l	<50 ug/l	AK 3657
#58 Core drill #5 nearest spring	12/28/81	EPA	Reg 7	<50 ug/l	<50 ug/l	AK 3658
#59 Blank	12/28/81	EPA	Reg 7	<50 ug/l	<50 ug/l	AK 3659
#14 Evaporation Pond E-2	10/09/81	EPA	EPA-Reg 7	<5 ug/l	<5 ug/l	AK 3614
#15 Organic Blank	10/09/81	EPA	EPA-Reg 7	N/A	N/A	AK 3615
#16 Dean Jephins Res. Well	10/28/81	EPA	Reg 7	N/A	N/A	AK 3616
#17 Organic & Inorganic Blank	10/28/81	EPA	Reg 7	N/A	N/A	AK 3617

Arsenic - As [redacted]

Area Tested	Date	Sampled by	Analyzed by	Results	Detection Limit	Sample #
DH #16	10/28/81	EPA	EPA	< 20 ug/l	< 20 ug/l	AK 3616
DH #17	10/28/81	EPA [redacted]	EPA	<20 ug/l	< 20 ug/l	AK 3617
#13	2/22/82	KDHE	EPA Versar Lab	< 10 ug/l	10 ug/l	AC 2601
Harvey RWD #1	2/22/82	KDHE	EPA Versar Lab	< 10 ug/l	ug/l	AC 2602
#15	2/22/82	KDHE	EPA Versar Lab	20 ug/l	[redacted] ug/l	AC 2603
#11	2/22/82	KDHE	EPA Versar Lab	<10 ug/l	ug/l	AC 2604
#10	2/22/82	KDHE	EPA Versar Lab	<10 ug/l	ug/l	AC 2605
Dean Hopkins Stock Well	2/22/82	KDHE	EPA Versar Lab	< 10 ug/l	ug/l	AC 2606
#14	2/22/82	KDHE	EPA Versar Lab	< 10 ug/l	ug/l	AC 2607
#12	2/22/82	KDHE	EPA Versar Lab	< 10 ug/l	ug/l	AC 2608
Prairie Creek	9/17/80	RE Kindel ~~KDHE~~	KDHE	.08 mg/l	.001 mg/l	015C

State of Kansas . . . John Carlin, Governor

DEPARTMENT OF HEALTH AND ENVIRONMENT

Barbara J. Sabol, Secretary

Forbes Field
Topeka, Kansas 66620
913-862-9360

August 2, 1983

Dr. Jim Greene
Subcommittee on Natural Resources,
  Agriculture Research & Environment
Committee on Science and Technology
Suite 2321 - Rayburn House Office Building
Washington, D. C. 20515

Dear Dr. Greene:

We were pleased to have you in Kansas.

I have attached for your information my letter to Mr. Kay following up on the well 220 Dioxin testing. Staff have been instructed to provide you the NIES waste characterization data.

Also attached is the retyped copy of the testimony which should be substituted for the copy provided you on Saturday. The handwritten corrections are properly typed.

If there is additional information we can provide, please let me know.

Sincerely,

Barbara J. Sabol

Barbara J. Sabol
Secretary

BJS:mac

Enc.

State of Kansas . . . John Carlin, Governor

DEPARTMENT OF HEALTH AND ENVIRONMENT

Barbara J. Sabol, Secretary

Forbes Field
Topeka, Kansas 66620
913-862-9360

August 1, 1983

Mr. Morris Kay, Regional Administrator
Environmental Protection Agency
Region VII
324 E. 11th Street
Kansas City, MO 64106

Dear Mr. Kay:

I discussed briefly with Mr. Morby the need to move forward with the sampling and testing of NIES well 220 for Dioxin as quickly as possible.

Staff will be available any day this week or at your earliest convenience to accompany your representative to the site for the sampling.

Please have your staff communicate directly with Mr. Howard Duncan, Director, Bureau of Environmental Sanitation, Kansas Department of Health and Environment (913-862-9360, X-291) for agreement on the date and additional details.

I have attached for your information the testimony of the Department at the Congressional hearing on July 30, 1983.

Your assistance is appreciated.

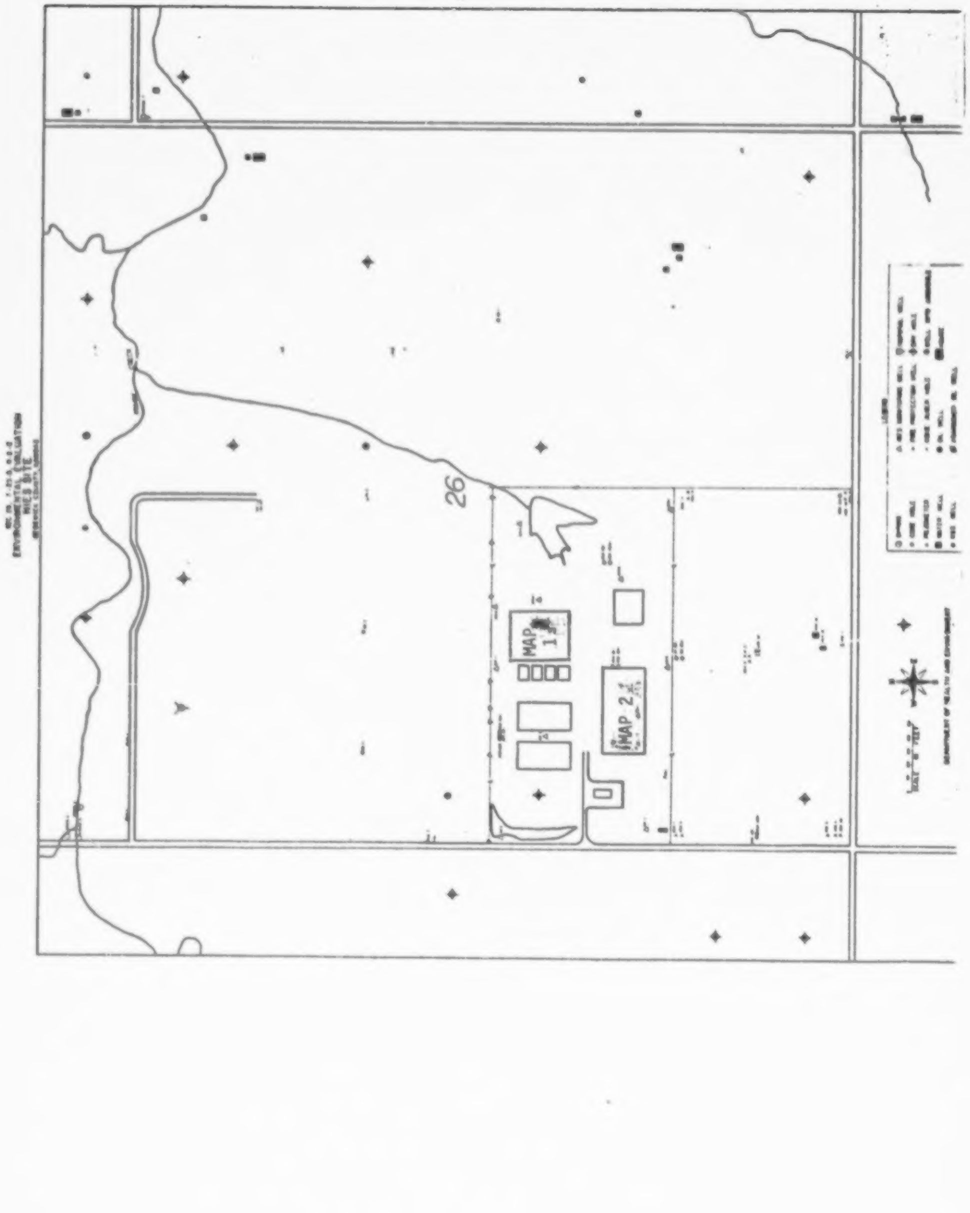
Sincerely yours,

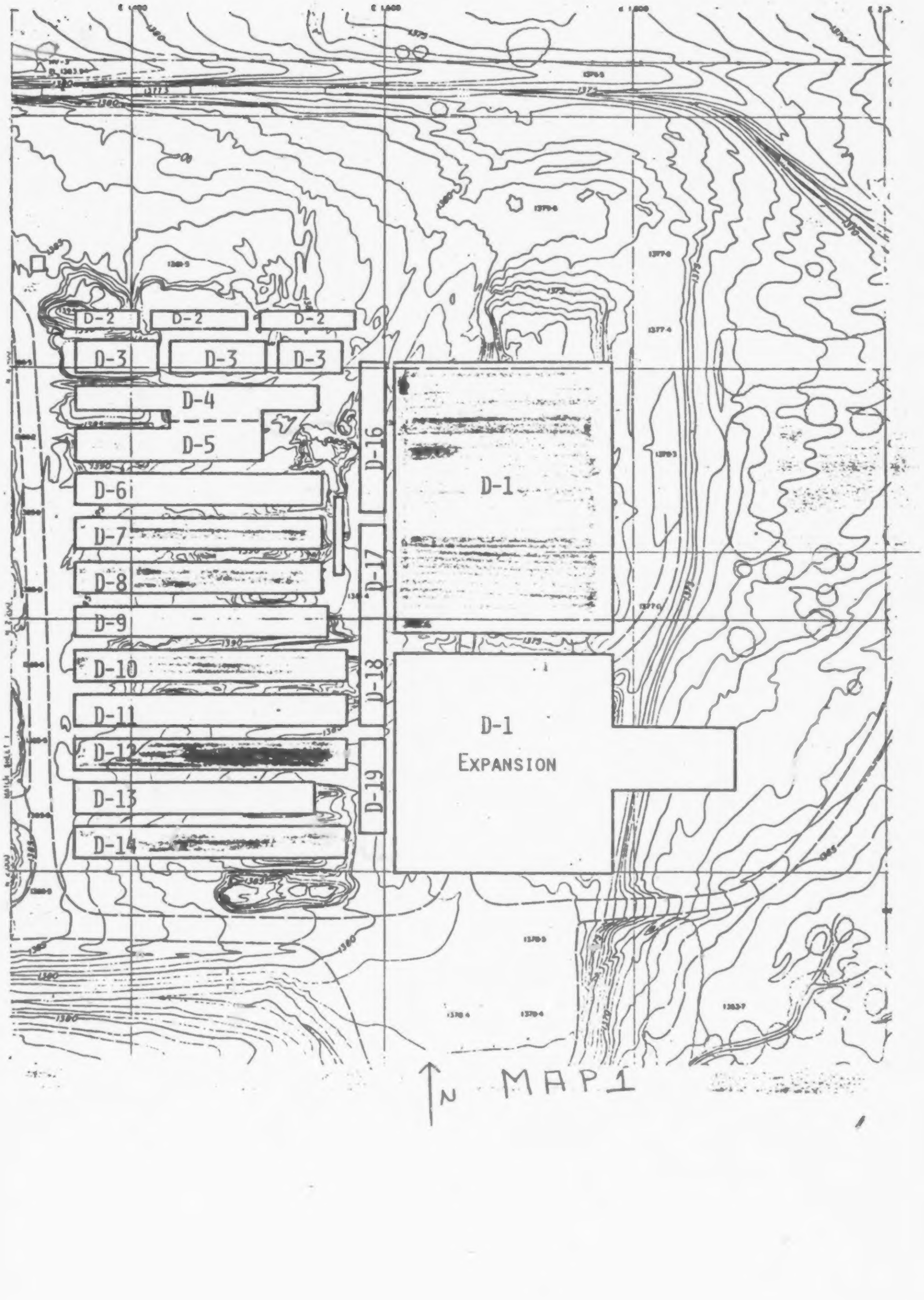
Barbara J. Sabol

Barbara J. Sabol
Secretary

BJS:mac

Enc.
bcc: Robert Morby
Joseph Hollowell
Pat Casey
Howard Duncan
John Paul Goetz


ENVIRONMENTAL EVALUATION
26
MAP 1
MAP 2
DEPARTMENT OF HEALTH AND ENVIRONMENT


D-2
D-2
D-2
D-3
D-3
D-3
D-4
D-5
D-6
D-7
D-8
D-9
D-10
D-11
D-12
D-13
D-14
D-16
D-17
D-18
D-19
D-1
D-1
EXPANSION
1380
1375
1385

↑N MAP 1

```
                                                                                                   PAGE  246
                                        THOMPSON-HAYWARD CHEMICAL CO
                                        EPA ID # : KST210010032

CONTACT : WILLIS HART        --PHONE #-- 913/321/3131
ADDRESS : 5200 SPEAKER ROAD                     CITY : KANSAS CITY          STATE : KANSAS
KANSAS COUNTY : WYANDOTTE                       KANSAS DISTRICT : NE

  DISPOSAL//******************************* WASTE NAME ******************************//DISPOSAL ESTIMATED//ACTUAL VOLUME
  PERMIT #//                                                                       //VOLUME/YR CUBIC FT// DISPOSED OF
   780156 // PESTICIDES AND INTERMEDIATES                                           //       1,474     //        854
                                                                      1978 TOTALS//       1,474     //        854
   ------------------------------------------------------------------------------------------------------------------
   780156 // PESTICIDES AND INTERMEDIATES                                           //       1,474     //         81
                                                                      1979 TOTALS//       1,474     //         81
   ------------------------------------------------------------------------------------------------------------------
   780156 // PESTICIDES AND INTERMEDIATES                                           //       1,474     //        280
                                                                      1980 TOTALS//       1,474     //        280
   ------------------------------------------------------------------------------------------------------------------
                                                                     GRAND TOTALS//       4,422     //      1,215



                                                                                                   PAGE  247
                                        THOMPSON-HAYWARD CHEMICAL CO
                                        EPA ID # : KST210010062

CONTACT : WILLIS HART        --PHONE #-- 913/321/3131
ADDRESS : 5200 SPEAKER ROAD                     CITY : KANSAS CITY          STATE : KANSAS
KANSAS COUNTY : WYANDOTTE                       KANSAS DISTRICT : NE

  DISPOSAL//******************************* WASTE NAME ******************************//DISPOSAL ESTIMATED//ACTUAL VOLUME
                                                                                   //VOLUME/YR CUBIC FT// DISPOSED OF
  PERMIT #//                                                                       //         235     //         58
   770189 // MELAMINE                                                               //         884     //        471
   770190 // PHENOXY HERBICIDE PRODUCTION WASTE CHEMICALS
                                                                      1977 TOTALS//       1,119     //        529
   ------------------------------------------------------------------------------------------------------------------
   780190 // SCRAP EMULSIFIERS AND PESTICIDES                                       //       2,948     //      1,760
                                                                      1978 TOTALS//       2,948     //      1,760
   ------------------------------------------------------------------------------------------------------------------
   770190 // PHENOXY HERBICIDE PRODUCTION WASTE CHEMICALS                           //         884     //         36
   780190 // SCRAP EMULSIFIERS AND PESTICIDES                                       //       2,948     //      1,251
   790005 // PARATHION                                                              //           0     //
   790110 // HERBICIDE PRODUCTION WASTE CHT REAGENT, 1104 RESIDUE AND CATACARB 251-H//         442     //        669
                                                                      1979 TOTALS//       4,274     //      1,956
   ------------------------------------------------------------------------------------------------------------------
   790110 // HERBICIDE PRODUCTION WASTE CHT REAGENT, 1104 RESIDUE AND CATACARB 251-H//         442     //        154
                                                                      1980 TOTALS//         442     //        154
   ------------------------------------------------------------------------------------------------------------------
   100374 // MISCELLANEOUS PESTICIDES. SEE HAZARDOUS SUBSTANCES & ADDITIONAL INFOR. //          14     //         14
                                                                      1981 TOTALS//          14     //         14
   ------------------------------------------------------------------------------------------------------------------
                                                                     GRAND TOTALS//       8,797     //      4,413
```

```
                                              PBI/GORDON CORPORATION
                                              EPA ID # : KSD007124357
CONTACT : ALAN PASCHANG      --PHONE #-- 816/421/4070
ADDRESS : 300 SOUTH THIRD STREET,BOX 2276      CITY : KANSAS CITY            STATE : KANSAS
KANSAS COUNTY : WYANDOTTE                      KANSAS DISTRICT : NE

  DISPOSAL//****************************** WASTE NAME *****************************//DISPOSAL ESTIMATED//ACTUAL VOLUME
  PERMIT #//                                                                        //VOLUME/YR CUBIC FT// DISPOSED OF
   800116 // PAPER,PLASTIC BAGS,CARTONS,FIBER CONTAINERS                              //     29,700     //        378
   800133 // 2,4D, MCPD, AND BANNEL-D CONTAMINATED FLOOR SWEEP AND SOIL               //        368     //        905
   800145 // SOIL                                                                     //      1,620     //      2,024
                                                                         1980 TOTALS//     31,688     //      3.307
   --------------------------------------------------------------------------------------------------------------------
   100196 // SOIL                                                                     //      2,700     //      5,246
   100221 // OFF-SPEC PRODUCT: 5% SEVIN DUST,LIQUID, DMB#2                            //        316     //        162
   100271 // PAPER,PLASTIC BAGS,CARTONS,FIBER CONTAINERS                              //     29,700     //      3,051
   100307 // DIRT,DUST,POWDER,FLOOR SWEEP,DRY-RITE,SLUDGE                             //        737     //      1,751
                                                                         1981 TOTALS//     33,453     //     10,210
   --------------------------------------------------------------------------------------------------------------------
                                                                        GRAND TOTALS//     65,141     //     13.517
```

The Furley Dump

Part I: Laying Waste in Toxic Times

BY TONI HARVEY

The Furley landfill is still leaking. ☐ Contamination had been found in at least two, possibly three, levels of underground water (aquifers) as of last year with contaminants spreading northward. Now, evidence indicates contamination is continuing at the top level (A-zone) aquifer and spreading to the south and west as well, possibly in all directions. ☐ And while massive steps have been taken to prevent more seepage from the dump site onto adjacent properties, still nothing has been done to clean up previous leakage that continues to trickle into springs and a nearby creek that flows into the Whitewater River. ☐ And the stakes are greater than ever at the hazardous waste landfill north of Wichita. The landfill's closed now — by order of the governor — but its owners, Waste Management, Inc. (WMI) are determined to reopen the site to recover their $3 million cleanup investment. Indeed, they are determined not only to reopen it, but to expand it — to double its size. It's a potential multimillion profit operation for them. ☐ Yet the possibility still exists that the spread of its cancer-causing chemicals has not stopped and can't be stopped.

At first, there was underground contamination at the site itself; then, it spread to the north, to the south and tests now show it to the west.

The place could well be a time bomb. Frank Wilson, senior geologist with the Kansas Geological Survey, has compared the Furley situation to New York's Love Canal disaster. The Environmental Protection Agency (EPA) plans to check for dioxin contamination.

As a cleanup measure, a massive trench has been dug to prevent contamination from spreading to adjacent (private) properties to the north. To help prevent further contamination on the dump property, the company has put a layer of clay over the tons of already-buried hazardous waste to slow down rain water that might carry contaminants further into the aquifer.

The company says contamination is being contained on its own property. And while contamination levels still exist on adjacent properties to the north and south, the company says those have to do with contamination that existed before they dug their big trench.

And no one can really prove anything.

The EPA would like the company to dig another trench. They have yet to respond to this suggestion. So far there have been no moves on the part of the company — nor by the state of Kansas — to clean up the contamination on nearby properties.

James Aiken, director of environment for the Kansas Department of Health and Environment (KDHE) says such a cleanup would be "impractical." Property owners say it not only is practical — but necessary. They've sued the Furley landfill and its parent company owners for $15 million — $5 million in compensatory damages, $10 million in punitive. The case is expected to come to court in late 1984.

In the meanwhile, WMI wants to reopen the landfill.

Area landowners and residents want it closed — forever.

The final decision rests with the EPA and Barbara Sabol, the newly appointed secretary of the state department of health and environment (KDHE). Ms. Sabol has yet to express a public opinion on the reopening, but does say the cleanup of the site is her priority before she will address the question of its being reopened.

© 1983 by *Wichita City Life*

WMI AND REGULATORS

The landfill's original principal owner was Gene Miles, a Wichita realtor and developer. Mr. Miles began his operation on 80 acres in 1977 and applied for a permit to double the landfill's size in mid-1980. In December, 1980, he sold the site to Waste Management, Inc. (WMI), a billion dollar public corporation — the largest handler of chemical hazardous wastes for private industry of any company in the world.

The site is regulated by the Kansas Department of Health and Environment (KDHE) and the Environmental Protection Agency (EPA). While the ultimate decision concerning the landfill's fate rests with Ms. Sabol and the EPA, many of its regulation decisions are made by KDHE's director of environment, James Aiken, who formerly was the environmental health director for Wichita and Sedgwick County.

Ms. Sabol has yet to take a public position on the landfill and its parent company, Waste Management, Inc.

Mr. Aiken, however, has publicly praised the company's cleanup efforts, written

THINK of
Future
Families

On the road, even in cars, Furley residents have protested the landfill several times. Resident Dinah Lies holds her child, Stephanie, while Kiley Dienst keeps them company.

recommendation letters concerning the company to other states, and minutes of a July 14, 1980 meeting of the Wichita Area Chamber of Commerce quote him as saying that "testimony in favor of the facility (the Furley landfill) by the business community would be valuable during the public hearing" on the landfill's possible expansion.

And at that expansion hearing, Mr. Aiken testified that the landfill's proposed expansion was environmentally acceptable.

He also said, when recently interviewed, that he thinks the company's present clean-up will prevent further contamination and its trenches and ponds can be engineered in such a manner so that contamination won't occur again.

"I don't think there's any question that this site can be designed and constructed with the conditions at this site to comply with all the standards that are required for hazardous waste disposal," he said. "I'm not saying that will happen, I'm saying it can be done. . ."

Mr. Aiken says he doesn't remember the Chamber of Commerce meeting cited above, but adds, "I was not soliciting testimony by the business community. I was just stating facts.

"The basic concept is that generators of hazardous waste have to have some method of disposal. The generators of hazardous waste in Kansas need a disposal facility — they still need one."

Furley area residents who want the landfill closed forever say Mr. Aiken is on the side of Waste Management, Inc. and against them.

Sedgwick County Commissioner Don Gragg is particularly critical of Mr. Aiken.

"I think it was an error in judgement when he was appointed to that position (KDHE's director of environment)," Mr. Gragg said. "Aiken always said there was no problem. Those people are not going to believe a thing. It's abrasive and distasteful to me to this day that Jim Aiken has always said there was no problem there when most of us were doggone sure there was a problem. How are we then to believe it all today that there's no problem or that the problem has been corrected?"

Mr. Aiken, however, takes such comments in stride. "The secretary's the official spokesman on the agency for the (operation), I'm a spokesman for what I perceive to be the facts related to the information and the implications related thereto.

"Gragg is entitled to his opinion.

"Our responsibility is to the citizens of the state of Kansas. That's the way we conduct our affairs."

But Mike Everhart, the man who took Mr. Aiken's place as Sedgwick County's environmental health director, disagrees with him and has publicly come out against the reopening of the Furley landfill.

Mr. Everhart has been involved with the landfill from its beginning, and, he says, at first he "believed in" the landfill because there was a need for a place to safely dispose of hazardous chemicals. But he's changed his mind.

"Up until late 1981 when we started finding this stuff in the springs I was looking for all kinds of explanations of how that stuff could appear, Mr. Everhart said. "I didn't want to believe that thing was falling through because we do need that place or a place like that.

"I don't feel it's worth the risk to go ahead and reopen the site and put thousands of tons of additional chemicals into that area."

Mr. Everhart's sentiments are shared by Wichita State University geology professor J. R. Berg. Dr. Berg testified against the original opening of the Furley site in 1977 and has maintained since then that the area is not geologically suitable for the disposal of hazardous waste.

"There were so many mistakes made in the site proper from the start that it would be futile to try to do anything with it," Dr. Berg said recently. "I think they ought to ban it and start over somewhere else."

Frank Wilson, of the Kansas Geological Survey, headed a team of scientists in 1981

PHOTOGRAPHY • STEVE JONES / ARK VALLEY NEWS

Wichita State geology professor J. R. Berg testified against opening the landfill in 1977. "I think they ought to ban it and start over somewhere else," he says.

to study the geology and hydrology of the proposed expansion area directly south of the existing site. Mr. Wilson is highly critical of the company's geotechnical engineering reports on the original and expansion sites and of state (KDHE) officials. He, too, believes the site should be cleaned up and shut down.

Attorney General Robert Stephan has also been critical of the site's operation and was instrumental in blocking its expansion in 1980 until an independent study of its suitability could be done.

"I don't think the site should have ever been opened, at least not the way they opened it," Mr. Stephan said, referring to the fact that KDHE depended on a report by company-hired consultants to determine if it was geologically suitable. "Dr. Berg's testimony should have triggered a concern by state officials to look further into it." But, indeed, KDHE issued the landfill permit the day after Dr. Berg testified against it.

Mr. Stephan, who said he does not want to act "as an irritant," added he will wait and see about the site's reopening.

"In the event the secretary of KDHE intends to reopen the site," he said, "I intend to satisfy myself that there are independent studies to show it's appropriate and if there are not, then I will bring suit to attempt to stop the reopening."

Although he says he has yet to form an opinion on the reopening of the Furley site, Commissioner Gragg testified against the expansion of the landfill in 1980 and pushed for countywide zoning (which was passed) so that if the company wants to expand south to an additional 80 acres it will have to apply for a zoning change which, in turn, requires a public hearing. Commissioner Gragg, whose district includes the Furley community, has complained that Sedgwick County — and its officials — have no authority over the site. While he believes the county must have hazardous waste sites, Mr. Gragg said, "we can't take major risks of letting (hazardous chemicals) get into the water table."

In addition, there are the people of the Furley community whose lives have been altered in numerous ways by the landfill. The last six years have been difficult, especially for those who live closest to the site. Because they fear contamination of their well water, most have stopped using it for drinking although some still use it for bathing.

Some have paid to be connected to the rural water district, which can cost $3,000, but others cannot afford it. They've endured odors from the dumping of the chemicals and have lived with the knowledge that their land, some of it homesteaded by their ancestors, is worth little on the open market. They say the wooded area north of the site, once a haven for deer, rabbits, birds and other wildlife, is virtually uninhabited now.

Mike Everhart, Sedgwick County environmental health director once favored the Furley landfill. Now he says, "I don't feel it's worth the risk to go ahead and reopen the site and put thousands of tons of additional chemicals into that area."

Running through all their stories about the landfill are two common feelings: fear and a virulent distrust of the company and the state health department. That distrust has propelled several housewives into an almost-daily routine of educating themselves on hazardous waste and its disposal methods, collecting letters, documents and well reports on the landfill, maintaining contact with others fighting hazardous waste dumps across the nation and badgering state and federal health officials almost mercilessly in an attempt to get answers and convince them to close the Furley landfill.

A group of Furley residents have filed a class action lawsuit against WMI and the landfill's local operating company, asking $5 million for compensatory damages and $10 million for punitive damages. They charge that the soil and water has been contaminated, the landfill has created a nuisance from noxious fumes, area property values have plummeted and the site's operators have violated federal statutes. They are seeking an injunction to keep the site permanently closed and to have all wastes removed. Their attorney, Randy Rathbun, estimates that it will be late 1984 before their case is tried in court.

DIFFERENT TESTS SAY DIFFERENT THINGS

When state officials first issued a permit for the Furley landfill site to open, their decision was based on a study done by Standard Testing and Engineering Co., of Oklahoma City. Standard was hired and paid by National Industrial Environmental Services, the landfill's local operating company. Standard drilled seven test borings on the 80 acres to test for soil permeability and the location of "water-bearing stratas." The engineers did find "pockets and nodules" of decomposing silt and gravel but concluded that they should have no effect on the proposed facility. The author of the Standard report, Lee Deets, wrote that the soils and subsurface conditions on the site were suitable for a hazardous waste dump "providing that the conditions throughout the site do not differ drastically from those in our test borings."

Frank Wilson, the Kansas Geological Society geologist, who studied the expansion site in 1981, disagreed with Mr. Deets' conclusions. He called the Standard report "uninformed." He said he drilled a well 51 feet deep immediately next to a Standard hole that went down 55 feet. Standard's report indicated their well as

PHOTOGRAPHY • BRYAN MASTERS

A FURLEY PRIMER

What is the Furley Dump-landfill?

Its real name is National Industrial Services and its an 80 acre hazardous waste landfill approximately 10 miles northeast of Wichita at 8808 N. 127th St. East. It's known as the Furley Dump or Furley Landfill in that it's four miles southeast of the community of Furley.

Who owns it?

It's owned by Waste Management, Inc., a billion-dollar public corporation with headquarters in Oak Brook, Ill. The firm operates about 20 hazardous waste disposal sites and has business operations in the U.S., Canada, Argentina, and Saudi Arabia. It's the largest handler of chemical/hazardous wastes for private industry of any company in the world.

Why is it closed?

Chemical contamination was discovered in the groundwater under the site, south of the site and north of the site (on private property) and in the springs that feed Prairie Creek (half-mile north), a tributary of the Whitewater River.

What kind of contamination?

The contamination includes at least 20 solvents; that is, unwanted by-products of manufacturing processes. For example: **vinyl chloride,** used in making plastics and as a refrigerant; **trichloroethane,** the main solvent in dry cleaning and also used as an extractorand in the manufacture of pharmaceuticals; and **toluene,** used in refining petroleum, in making explosives, perfumes, asphalt, detergents, as a solvent for paint, coatings, nail polishes, even in plastic toys for model airplanes.

How potentially dangerous are the contaminants?

We don't know. Several of the chemicals leaking from the Furley Landfill are among those listed by the Environmental Protection Agency as probable sources of dioxin, one of the most dangerous, lethal substances known.

And most of the chemicals leaking form the landfill are solvents which are known to be carcinogenic; that is, cancer-causing. Also, there are a variety of illnesses and effects that can occur from ingesting toxic chemicals, such as bladder and kidney failure, birth defects, miscarriages, liver disturbances, jaundice and fatigue. All the above depend on the amount of exposure to the solvents and chemicals.

How much is leaking — or has leaked?

The groundwater throughout the Furley landfill site is highly contaminated and very dangerous. At this point there is no evidence that water wells on adjacent private properties are contaminated, but there is contamination, high contamination, on adjacent property to the north. Prairie Creek, a half-mile to the north, has a low contamination reading, but more contamination continues to trickle into the creek at a slow, steady rate.

Have the leaks been stopped?

Waste Management, Inc. has spent $3 million in a cleanup effort. A massive ground trench has been dug in an attempt to prevent contamination from reaching the private land to the north. Contamination from the site flows onto the trench, and it's pumped out, hauled away, or put in a pond where supposedly it evaporates.

However, as of this writing, nothing has been done — or is

dry; Mr. Wilson's found water at 46 feet. Two wells, next to each other, with different readings. Could the discrepancy be due to a changing water table?

"No," Mr. Wilson insisted. "We were out there during 10 inches of drought."

At any rate, company officials believed the site was ideally suited for the disposal of hazardous waste, as evidenced in a comment by NIES (the Furley landfill's) general manager Cliff McDaniel during a 1980 interview.

"We're sitting on 90 feet of clay," he said. "There's no aquifer to contaminate."

Business was good at the Furley landfill with chemical wastes coming in from all over the Midwest at increasing rates, so much so that the company purchased the 80 acres directly south of the site and applied to the state (KDHE) for a permit to expand. The response from the Wichita Area Chamber of Commerce and the local business community was enthusiastic, with such major companies as Cessna, Beech, Learjet and Coleman writing letters of support for the expansion.

But the people of the Furley community were decidedly unenthusiastic and complained at a public hearing that NIES, the landfill's local operating company, and the state (KDHE) had promised that when the site opened it would be 25 years before an expansion would be needed.

Their charges of violations were investigated by Attorney General Stephan who asked KDHE to make changes in its regulation of the landfill so that the problems would not reoccur. It was during Mr. Stephan's investigation that the *Ark Valley News,* a newspaper in Valley Center, had reported discrepancies in engineering reports on the proposed expansion site. He demanded that an independent team of scientists study the south 80 acres before an expansion permit be issued.

The original report on the expansion was written by T. Allan Haliburton, an engineering professor at Oklahoma State University. Dr. Haliburton was hired and paid by NIES to study the suitability of the acreage for a hazardous waste dump. He concluded that the "geotechnical suitability of the proposed site is equal to or perhaps somewhat better than that of the existing facility."

Dr. Haliburton reported the presence of one well on the acreage and said it was dry. But the former owner of the land, Lillian Miller, who vacated in July, 1979, said in a 1980 interview that the land had three wells, all containing water when she left. Dr. Haliburton's report was written in August, 1979, but his response to the discrepancy was that the presence of wells — containing water — wasn't "technically relevant."

But KDHE thought the discrepancy regarding the wells and a report by the *Ark Valley News* that Prairie Creek, one-half mile north of the site, was fed by underground springs were relevant and the department acceded to the attorney genbeing done — to remove the contamination from the private property to the north — and that's the contamination that's leaking into the springs and creek.

Will the contamination of private property near the site continue?

No one knows for sure if the company's massive trench will totally prevent future leakage to the property to the north, to Prairie Creek, even possibly to the Whitewater River.

The Environmental Protection Agency has suggested another intercept trench on the private property. However, as of this writing, neither WMI nor the Kansas Department Health and Environment has publicly responded to the recommendation. However, prior to the EPA's recommendation, James Aiken, director of environment for the KDHE told us that to clean up the private property north of the site would be "impractical" unless an emergency situation arises; then, he said, "something could be done."

Can it be assured there will be no future leaks?

Nobody, absolutely nobody, has said this current cleanup will do the trick forever. Some have definitely said it will not — the owners of nearby properties. Some have said it may not and probably won't — people like Mike Everhart, environmental health director for Sedgwick County, and Dr. J. R Berg, professor of geology at Wichita State University. Some have said it will — WMI, the company that owns the site.

What's the argument for the Furley landfill?

Like it or not, Wichita industries produce hazardous wastes and they have to be dumped somewhere. Business and industrial leaders say if not the Furley site, another one will have to be found. Not only another one, but two, three, possibly four more. They say Wichita industry requires hazardous waste landfills within Sedgwick County; if not in Sedgwick, then very nearby.

What's the argument against the Furley landfill?

The argument is that its ground is geologically unsound, that regardless of preventative measures, eventually contaminants will find their way to nearby properties, creating serious health hazards, in effect, depopulating the area. Also, eventually cantaminants may find their way from the landfill to the Whitewater, Walnut, and even the Arkansas rivers.

What about future leaks?

Nobody knows for sure. The contaminants which are pumped out of the trench into ponds will either evaporate, stay in the pond water or leak back down into the ground and produce more contamination. Then, there is the matter of buried drums of hazardous waste — drums which contain tons of hazardous waste and are buried at the site.

Over a period of time, their contents will eventually eat through the drums and contaminate some soil and underground water nearby. To possibly prevent this, WMI has put a layer of clay, known as a clay cap or a clay umbrella, over the barrel trenches to keep rain water from seeping into the ground — rain water that might carry the contaminants from the leaking barrels into the underground water.

However, time is on the side of the contaminants. the clay cap of umbrella is subject to erosion, burrowing animals, weather, and other forces of nature. But some of the contaminants will remain toxic for as long as 500 years.

eral. Mr. Stephan's, demand that the site be studied by scientists not hired by NIES. That's when KDHE asked the Kansas Geological Survey to study the geology and hydrology of the south 80 acres.

Meanwhile, back at the landfill, NIES was impatient to obtain an expansion permit and filed a lawsuit, Dec. 31, to force KDHE to issue it, contending the company had met its obligations and should therefore be granted the permit. And before the KGS began its study of the land, NIES owners Gene Miles and Paul Nunn had sold the landfill to Waste Management, Inc., of Oak Brook, Ill. It was one month later that KDHE and the public learned of the sale.

The KGS study was done as planned, revealing that Prairie Creek, a tributary of the Whitewater River, was indeed fed by underground springs that might be linked to two aquifers (layers of water) under the landfill, possibly creating an avenue for leaking chemicals to move off the site and into the creek. The KGS report disagreed with a number of Dr. Haliburton's findings. The tests found that the soil between the bottom of the proposed burial trenches and the top of the upper aquifer was more permeable than Dr. Haliburton had reported. Dr. Haliburton also had reported water in only one of the test holes he drilled, concluding that the water was discontinuous (not connected, not a true aquifer). But the KGS study found water immediately in all the holes except one and it had water after 24 hours.

Summarizing the reports: the Standard and Haliburton reports, subsidized by the Furley landfill's owners, were favorable to the site. The KGS report, ordered by the attorney general, was not favorable to the dump site.

Joseph Harkins, who was then secretary of the Kansas Department of Health and Environment (KDHE) was critical of the KGS report. He told the *Wichita Eagle Beacon* that the KGS report provided no "conclusive information" and it was premature to check for contamination between the landfill and the creek. That was in June, 1981.

But one Furley resident, Sharilyn Dienst, wanted the springs and creek tested for contamination and met with Mr. Harkins in August, 1981. She persuaded him to have the testing done, but it was not until Oct. 9 that the tests were administered by the EPA. The state received the test results on Nov. 16, but they weren't released to the public until Dec. 28 when, on the same day, more tests were done. And they also showed contamination.

The landfill was closed Jan. 18, 1982. KDHE then hired a consulting firm from Chicago, CH2M Hill, to oversee new studies on the extent of the contamination and proposals for cleanup to be done by the Woodward-Clyde Co., of Chicago, a consulting firm hired by Waste Management, Inc. WMI presented its latest proposals Feb. 25 of this year for completing the cleanup and has asked to reopen this spring.

the Sportshop

A Great Sporting Goods Store Just Got Better!

We're closer to you - we're OPEN NOW in WESTWAY,

Seneca & Pawnee

WESTWAY
2465 S. Seneca
263-8293

EASTGATE
8031 E. Kellogg
684-5705

PARKLANE
938 S. Oliver
685-5871

WHERE THE PARTY BEGINS

Wichita's convenient shopping for Cocktail utensils and accessories, mixers, ice, and cigarettes.

- Discount prices available on larger orders
- T-Shirt Close-out Sale

Wall's Mix Shop

845 S. Oliver / Wichita, Kansas / 683-6990

WHAT ABOUT THE LEAKS?

But have the leaking chemicals been stopped? They're industrial organic solvents, most of them listed by the EPA as carcinogenic; that is, possibly cancer-causing.

No evidences of the solvent have been found in the wells of those living near the site, KDHE officials say, and those wells have been and will be checked periodically. Several farm wells were found to be slightly contaminated with chemicals similar to those buried at the site but officials believe the wells were contaminated by other sources such as grain fumigants or from a Freon tank on a well.

But monitoring wells on the site, itself, show very high levels of solvents in the upper aquifer, approximately 40 feet below the ground and smaller levels in the two aquifers beneath that. Those high concentrations were moving northward, officials believe. At the time the landfill closed in January of last year three test holes on its northern boundary showed contamination from more than 20 chemicals, and tests done several months later from a well 600 feet north of the landfill's northern boundary on the Erdwiens' property showed contamination at levels as high as those found below the site in January.

And tests taken in August last year showed high levels of contaminants in wells on the southern and western boundaries of the landfill, indicating that the leakage was not confined to the north, and may well have spread, and be spreading, in all directions.

Just what all this means remains to be seen, but EPA figures indicate that cancer risks greatly increase from long-term exposure to many of the chemicals leaking at the landfill site.

Fortunately, the levels in the springs, one-half mile north of the site, are much lower than those under the site, possibly because the springs are fed by the lower aquifer known as the B-zone. Mr. Everhart theorizes that the highly contaminated A-zone upper aquifer spills over into the less contaminated B-zone somewhere near the springs. He believes the levels of contamination in the springs and seepages are slowly increasing, but Mr. Aiken says they are "generally staying at the same level."

As might be expected, Prairie Creek is also contaminated. Low levels of chemicals were first detected in January of last year and still appeared in January this year. They are not detectable downstream because of the dilution factor. ☐

End of Part I — *Part 2 on the chemical composition of the contamination the will be printed in next month's June issue.*

The Furley Dump

Part II: Laying Waste in Toxic Times

BY TONI HARVEY

[redacted]

Last month's story on the Furley hazardous waste landfill, just 10 miles northeast of Wichita, focused on the continuing leakage of cancer-causing chemicals from the landfill into the groundwater under it and on adjacent private properties to the north. Contamination from toxic industrial solvents has also been found in Prairie Creek, one-half mile to the north, which empties into the Whitewater River. ☐ And newly discovered evidence indicates that the chemicals may be moving in all directions from the site. ☐ But the company that owns the landfill, Waste Management, Inc. (WMI) in Oak Brook, Ill., wants to reopen the site at double its size and contends that its $3 million cleanup of the groundwater is working.

Others disagree — and Furley area residents are suing WMI for $15 million and asking that the landfill be closed permanently and the wastes be removed.

The agencies that regulate the site, the Kansas Department of Health and Environment (KDHE) and the federal Environmental Protection Agency (EPA), can't seem to agree on how to proceed with the cleanup which has already taken 18 months and is not complete yet.

Meanwhile, contamination from those industrial solvents appears to be spreading and now it is suspected that contamination from dioxin, a highly toxic, dangerous chemical, may also be present in the water.

WHAT ABOUT DIOXINS?

There's probable evidence of dioxin — one of the most toxic, lethal substances known to science.

Tests on Aug. 26, 1981, revealed two chemicals, 2-4-5-T and 2-4-D, which contain the byproduct dioxin, in a well at the site itself. The chemical 2-4-5-T measured 45 parts per billion, a very small amount, but 2-4-D measured 39 parts per billion.

A well on the northern boundary line of the site as of Jan. 20 of last year showed chemicals the EPA lists as highly probable to contain dioxin such as 100 parts per billion of pentachlorophenol and other chemicals at 25 and 10 parts per billion.

In February of 1982, both evaporating ponds at the site showed chemicals highly probable to contain dioxin, particularly in the pond that contains the waters now being pumped from the contaminated aquifer beneath it.

But the highest concentrations so far were found in a well on the site — 5,400 parts per billion of pentachlorophenol as well as chemicals measuring 490 and 380 parts per billion. And there are other suspected sources of dioxin in that well — in huge amounts.

It must be emphasized that dioxin has yet to be found.

But the above chemicals are among those listed as "highly probable sources of dioxin" by the Environmental Protection Agency.

The EPA is currently testing selected wells for dioxin, and expects to release the results in about a month.

It can be argued that some of the measurements listed above are so small as to be insignificant. But some of them aren't. And environment textbooks tell of experiments conducted on animals where dosages of dioxin in very small amounts proved to be fatal; for example, in rats, 5 parts dioxin for every trillion of food has led to cancer.

Obviously, Furley area people are concerned. Their cattle drink from Prairie Creek. "This place could turn into another Times Beach, Missouri," a resident said.

ARE LEAKS HEADED SOUTH?

There are related fears and concerns.

Sedgwick County Environmental Health Director Mike Everhart fears that the stretch of contaminated underground water on the Erdwien property that feeds into springs that then feed into Prairie Creek might not continue its slow trickle and, instead, someday erode what he believes is a barrier of sloping soils and send a barrage of highly contaminated water literally rushing into the springs.

But state Director of Environment Jim Aiken discounts the possibility.

"There isn't any rushing of water in that aquifer because it doesn't move that fast," Mr. Aiken says. "We know there's not that much water in the A-zone (upper aquifer showing the heaviest contamination)."

And it's true there isn't that much water in the "A-zone," that is, the upper level of water, but it's also believed that the contaminated water that feeds into the springs is a combination of water from not only the "A-zone" but the lower "B-zone" as well.

As for what's being done to prevent any of that water still under the Erdwien property from continuing to leak into the springs and creek, at least at this time — nothing.

So far, the Environmental Protection Agency has taken something of a backseat in the regulation of the landfill. However, according to Robert Morby, chief of the waste management branch of the region's EPA, this will change if the site is allowed to reopen and appears to be changing now, as a "thorough review" of the site is planned in response to recent revelations on the spreading of the contamination.

The EPA has, however, recommended another intercept trench on the Erdwien property north of the site to keep the already-contaminated water out of the springs that flow into Prairie Creek. However, as of this writing, the company (WMI) and the state (KDHE) have yet to respond to the EPA recommendation.

The EPA also has called for a "Part B" rating for Furley, which means that if the site reopens it will have to meet more stringent requirements under the Resource Conservation and Recovery Act and that the EPA will make the ultimate decision on reopening even if Ms. Sabol of the KDHE gives her approval.

Mr. Morby says the call for a "Part B" was motivated by the EPA's concern about the contamination and the cleanup.

A study of the site reports reveals that the groundwater contamination occurred not long after the chemicals were first placed in he ground — first detected in December of 1978.

But it was in September, 1980, that groundwater testing demonstrated conclusively that the solvents were leaching through the soil into the groundwater. As for this year — the water under the site is still highly contaminated.

Some KDHE officials believed the contamination reported in 1980 was caused by employees using a contaminated pipe rather than by toxic leakage. Thus, later, they didn't attribute the 1980 contamination readings as warnings of contamination to come. But still, when the EPA analyzed the pipe back in 1980, it found that the chemicals on the pipe were not the same as those found in the wells.

Then, too, it was revealed in January, last year, that the groundwater below the proposed expansion site is also contaminated. Small amounts of six different solvents were found in wells on the south 80 acres on Jan. 13, 1982. A well in the southwest corner of the acreage was found to be contaminated two months later, and again, Nov. 15, five different solvents were detected. On Feb. 16 — barely three months ago — four solvents were reported.

And in the southeast corner of the south 80 acres a well began showing slight contamination by five different solvents as of Nov. 15 of last year. It continued to show contamination in December, and in January and February of this year. Well tests south of the southernmost trenches on the original site show high levels of contamination.

You might think the contamination is headed south.

Mr. Aiken doesn't believe the tests are an indication that the contamination is headed south from the existing site because the levels are "not all that high," but he said the department will continue to monitor the situation.

"From a hydrological standpoint, it doesn't appear likely at all that any water from the site would be moving one-half mile south," Mr. Aiken said. "We have never felt that stuff was moving south. It just decries any logic. At the moment, it doesn't appear that the contamination in the southeast and southwest corners of the south 80 acres is any problem."

As one might expect, Mr. Everhart disagrees, countering that chemicals tend to move from an area of concentration to areas of lower concentration.

AT FURLEY: TOXIC TIMES UPDATE

Our first Furley landfill story appeared in our May issue. That story was completed approximately April 10 so we could get the magazine to the printer and have it back by May 1.

In that story we reported that samples of wells taken in August of last year indicated additional contamination in high levels on the southern and western boundaries of the Furley landfill — and that these reports hadn't been previously released.

Those reports were given to us by Sharilyn Dienst, a Furley area resident, who regularly requests and studies well test results from the landfill site. She noted that the reports she had received for the month of August were only blank pages. There was a gap. She then tracked down the missing pages.

"All the big stuff was in the gap," she said. Sure enough, they showed more leaks, more contamination.

More has happened:

- The Environmental Protection Agency has confirmed it was not aware of the missing reports and that the EPA was unaware of spreading contamination.
- Kansan Senator Robert Dole has asked the EPA to conduct a $500,000 audit of the hazardous waste division of the Kansas Department of Health and Environment (KDHE). He charges that state officials have ignored 15 specific recommendations the EPA made to KDHE regarding the landfill's cleanup.
- The EPA released information to us confirming they had made cleanup recommendations as of last Oct. 13, then followed up with a letter of Oct. 19. But as of last Oct. 18, KDHE had given the go-ahead to the Furley landfill's owners to proceed with much of their cleanup plan, a plan which didn't include many of the EPA's recommendations, particularly one that requested the testing of a synthetic liner that was installed for a new toxic waste burial pit.
- The state legislative post-audit committee has begun an investigation of KDHE's handling of the landfill.
- Attorney General Robert Stephan wrote EPA Regional Administrator Morris Kay charging that "the state is not working as fast as it should in the cleanup" asking the EPA to take a more active role.
- The EPA now says they are reviewing KDHE's files on Furley and are instituting a "thorough review" of the landfill for a final closure plan or a conditional reopening application.
- Resident Sharilyn Dienst has asked Mr. Kay to declare the Furley landfill an "imminent and substantial endangerment" to health and the environment under the federal Resource Conservation and Recovery Act. That would allow the EPA to take a variety of actions, including permanent closing of the site.
- KDHE Secretary Barbara Sabol has directed the KDHE's hazardous waste division to develop its own cleanup plan for the landfill. She has created a "Furley task force," and removed Melville Gray, deputy director of environment, from his position as project manager of the landfill, and named James Aiken, director of environment, as the new project coordinator.

BY TONI HARVEY

"They don't always move down, they can move against the flow," he explained. "I would hate to think that we actually have a mound (of water) under the whole site and it's pushing out in all directions and it may well be."

While the EPA has no "definitive proof" that the south 80 acres' contamination is coming from the site, Mr. Morby said they have asked the KDHE for "a little more assurance" that such is not the case.

The EPA is also requesting continued monitoring of the "B-zone" and "C-zone" aquifers which have also shown low levels of solvents in the last year. These aquifers, particularly the "C-zone" are the ones neighboring residents draw from for their water wells — and they are not a part of the company's cleanup plan. They do not show high levels of contamination — with one exception — "high levels" of chromium, an inorganic contaminant probably placed in the landfill's treatment ponds, in four "B-zone" level wells. They are documented in an EPA letter sent to Mr. Aiken at the KDHE on May 17 of last year.

A number of solvents have been found in two "C-level" wells located in the southwest corner of the site and northeast of an evaporation pond. "I would have a great deal of difficulty hanging my hat on numbers that small as being accurate," Mr. Everhart said of the levels in the "C-zone" wells. "To me it's simply an indication of organic contamination and organic contamination should not be there."

The contamination, of course, should not be in any of the aquifers and WMI officials believe it has occurred because trenches in which barrels containing tons of hazardous waste were unlined. However, it was thought early in the landfill's history that the surrounding clay was so impermeable it could contain the chemicals — and some Furley landfill officials believed there were no aquifers (layers of water) under the site.

The permeability of the soil was first questioned by J. R. Berg, Wichita State University geology professor, in 1977, who testified that the soil was montmorillonite clay which expands markedly when wet and contracts markedly when it's dry, causing "innumerable deep fissures" or cracks which would provide access for chemicals to move down to sub-surface water. Dr. Berg was also concerned that soil permeability could be changed by chemical reactions.

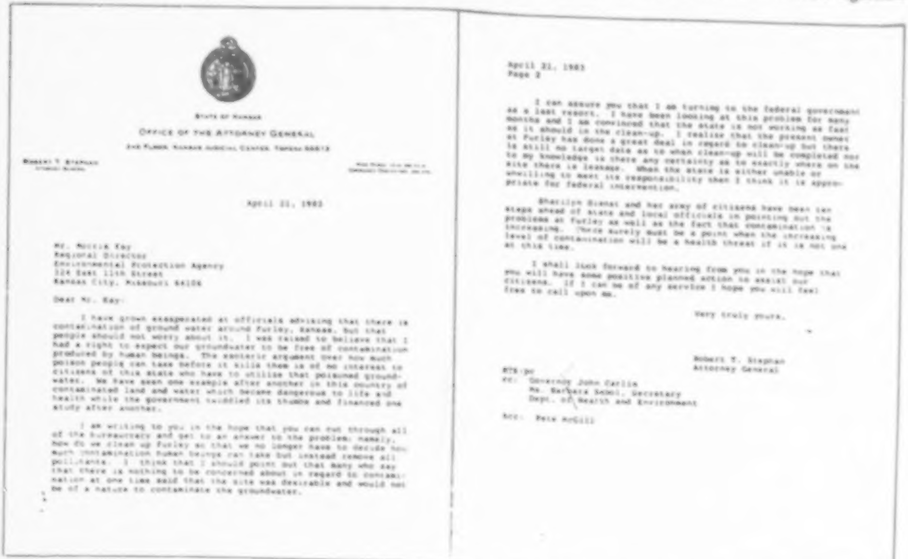
The Kansas Geological Survey and Woodward-Clyde (the Chicago consulting firm hired by WMI) studies found that some of the underlying soil was gypsum which dissolves in water and forms cavernous voids through which, according to Frank Wilson, the Kansas Geological Survey geologist who studied the site in 1981, leaking chemicals might go through "just like a direct pipe." One such void or dissolved rock channel was discovered under the burial trenches and treatment pond areas where it collected leaking chemicals and carried them northward off the site to the springs.

Mr. Everhart says soil permeability is "a localized thing. . .

"You can't go out there on that particular site and say just because the permeability in this hole is very poor that 10 feet away you don't have a rock bed that's like going through a sponge. There are all kinds of abnormalities — seams, water, sink holes, other geologic conditions that do not fit a nice definition of permeability. It may be super tight here and like a sponge over there."

Dr. Berg agrees, explaining that such abnormalities are peculiar to montmorillonite clay and that soil permeability will be dependent upon the weather.

But Mr. Aiken believes those problems can be worked around with the "right kind



STATE OF KANSAS

OFFICE OF THE ATTORNEY GENERAL

2ND FLOOR, KANSAS JUDICIAL CENTER, TOPEKA 66612

ROBERT T. STEPHAN
ATTORNEY GENERAL

April 21, 1983

Mr. Morris Kay
Regional Director
Environmental Protection Agency
324 East 11th Street
Kansas City, Missouri 64106

Dear Mr. Kay:

I have grown exasperated at officials advising that there is contamination of ground water around Furley, Kansas, but that people should not worry about it. I was raised to believe that I had a right to expect our groundwater to be free of contamination produced by human beings. The esoteric argument over how much poison people can take before it kills them is of no interest to citizens of this state who have to utilize that poisoned groundwater. We have seen one example after another in this country of contaminated land and water which became dangerous to life and health while the government twiddled its thumbs and financed one study after another.

I am writing to you in the hope that you can cut through all of the bureaucracy and get to an answer to the problem; namely, how do we clean up Furley so that we no longer have to decide how much contamination human beings can take but instead remove all pollutants. I think that I should point out that many who say that there is nothing to be concerned about in regard to contamination at one time said that the site was desirable and would not be of a nature to contaminate the groundwater.

April 21, 1983
Page 2

I can assure you that I am turning to the federal government as a last resort. I have been looking at this problem for many months and I am convinced that the state is not working as fast as it should in the clean-up. I realize that the present owner at Furley has done a great deal in regard to clean-up but there is still no target date as to when clean-up will be completed nor to my knowledge is there any certainty as to exactly where on the site there is leakage. When the state is either unable or unwilling to meet its responsibility then I think it is appropriate for federal intervention.

Sharilyn Bienst and her army of citizens have been ten steps ahead of state and local officials in pointing out the problems at Furley as well as the fact that contamination is increasing. There surely must be a point when the increasing level of contamination will be a health threat if it is not one at this time.

I shall look forward to hearing from you in the hope that you will have some positive planned action to assist our citizens. If I can be of any service I hope you will feel free to call upon me.

Very truly yours,

Robert T. Stephan
Attorney General

RTS:pw
cc: Governor John Carlin
Ms. Barbara Sabol, Secretary
Dept. of Health and Environment

bcc: Pete McGill

Attorney General Robert Stephan has gone on record as being critical of the private and state management of the Furley landfill. In an April 21 letter to the Environmental Protection Agency he called for its extensive investigative involvement, and an EPA study of the landfill is now under way.

of design and construction, taking those factors into account."

GEOLOGY AND THE FUTURE

The question remains: Is the Furley site geologically suitable for the disposal of hazardous waste?

"Our position is that the site is geologically suitable and that will be reinforced by the actions we've already taken in respect to operations on the site," said Don Reddicliffe, director of corporate and public affairs for WMI.

"I'm not prepared to say whether it is or not," Ms. Sabol at KDHE said. "I think as I look at the information, we'll have to get to that point."

"I don't think there's any question that this site can be designed and constructed with the conditions at this site to comply with all the standards that are required for hazardous waste disposal," Mr. Aiken said. "I'm not saying that will happen, I'm saying it can be done . . ."

"We know that the geology of the site is such that it will carry these chemicals away from the site," Mr. Everhart said. "From day one it was never able to hold what was put in it. There is no way of determining when the leaks started but I'm sure they started very shortly after the site was put into operation. That stuff may have been coming out in the springs several years before it was actually detected. I don't know that we magically found it at the same time it came out — I don't believe that. There's no reason to believe that it would suddenly start leaking."

Likewise there is disagreement over the viability of the company's cleanup although both Mr. Everhart and Mr. Wilson praise WMI for its efforts. The success of the cleanup will primarily depend upon the method the company is using to remove the contamination from the upper aquifer: a huge "intercept trench" dug 40 feet into the rock channel.

Contaminated water in the channel collects into the intercept trench and is pumped out and into an evaporation pond nearby. Thus it is hoped that the trenches (there is another to the south) will prevent any more contaminated water from moving north of the site. How long it will be necessary to pump water out of the aquifer is anybody's guess, but Mr. Reddicliffe says it will take "some time."

Mr. Aiken and Woodward-Clyde believe that the aquifer moves off the site only through one channel that has been found.

Mr. Everhart isn't so sure and he believes the contamination of the upper aquifer will continue indefinitely "as the barrels break down and the solvents and whatever else is contained in them continue to puddle in the trenches and move down in the aquifer. Hopefully, most of it or all of it will be intercepted by those trenches. If it is not, then it will go someplace else, somewhere."

All this means — possible recycling. That is, contaminated water is pumped out of an aquifer, then put in a pond above the same aquifer to evaporate. But instead of evaporating, it may eventually seep back into it because the bottom of that pond is just a few feet above the upper aquifer and may even intersect it.

The contaminated groundwater to the north of the site — on Erdwien's property — remains as it was. As of this writing, nothing has been done about it, Mr. Aiken says, because "it's impractical."

Mr. Everhart thinks that's a mistake. But Mr. Aiken says the springs are being monitored routinely and if the contamination rises to dangerous levels, something can be done. Asked if it wouldn't be too late then, Mr. Aiken responded, "We don't expect it to suddenly jump up like that."

What would be done if it did?

"I guess we'd put in another intercept trench," Mr. Aiken responded. "At this point in time it's not indicated that it would serve any useful purpose."

Mr. Morby, through the EPA, has suggested such an additional intercept trench near the springs, but, of course, that would raise the cost of the cleanup beyond the $3 million mark.

TO OPEN OR NOT TO OPEN

But that investment can be recovered if the site reopens and WMI has already begun improvements in preparation. A new disposal cell liner is nearly complete and should be ready for burial this spring, when WMI has requested the reopening. In a letter to Mr. Aiken dated Feb. 25, this year, WMI asked for reopening for solid and liquid wastes and said a public hearing is unnecessary, but if there is one they would prefer that it include the south 80 acres as well — so the landfill could reopen at double its original size.

But KDHE Secretary Barbara Sabol has said a public hearing to receive citizen input will be held before the landfill can reopen and Sedgwick County Commissioner Don Gragg has said a zoning application and public hearing must be held before an expansion can occur.

Attorney General Robert Stephan has warned the hearing on the reopening of the landfill had better be taken more seriously by KDHE than was its expansion hearing. "There will not be another window dressing without interference by the attorney general, I can tell you that," he said.

If the reopening and expansion are granted, WMI can be expected to operate the landfill to "state of the art" standards which include flexible membrane liners, that is, plastic liners designed to keep chemicals from contact with the soil. But some research on synthetic liners indicates they do not always prevent leakage, and that concerns Mr. Everhart.

"There are no guarantees that a seam wouldn't rip, stretch, break or develop a leak 10, 20 or 50 years from now," he said. "Maybe I'm asking for too much of a guarantee but if you can't guarantee that it won't leak sometime in the future then it has no business being out there."

Mr. Wilson is also uncomfortable with the dependence on synthetic liners to contain the chemicals permanently.

"What you're doing is creating a Love Canal situation," he said. "Let's say it doesn't leak until after 30 years, that the money is held in escrow and they're home free. Probably nobody's going to check that until it shows up in somebody's drinking water and they discover the thing is leaking."

If WMI is not allowed to reopen they will consider "a variety of options," including a lawsuit against KDHE, according to WMI official Don Walgren. But it is "clearly our intent to work with the state to try to accomplish reopening," said Mr. Reddicliffe.

Even if that lawsuit never materializes, WMI is involved in several others besides the one brought by the people of the Furley community. Gene Miles, former owner of the landfill, has filed a suit against WMI for the $2.4 million the company has yet to pay him for the site. And WMI is countersuing, claiming that Mr. Miles misrepresented the site when he sold it. WMI has also filed a motion drawing Mr. Miles and Mr. Nunn, a former co-owner, as defendants into the people's lawsuit against them.

The future of the Furley landfill promises still more controversy. If the site were to "leak severely," as Mr. Everhart puts it, the contamination of Prairie Creek might someday spread to the Whitewater, the Walnut and the Arkansas rivers. What the people of the Furley community want is to have the wastes removed and the site permanently closed. Mr. Everhart admits the idea may not be practical although it is the "ultimate solution."

And the problem of how to dispose of hazardous wastes won't be over for the state of Kansas if the Furley site is not allowed to reopen.

"We've *got* to have hazardous waste landfills here (the Wichita area)," says Commissioner Gragg. "You cannot ignore the problem and think it will go away or it will be in roadside ditches or in any other places . . ."

Cliff McDaniel, the landfill's general manager, also has expressed concern about illegal dumping of toxic wastes in a comment that now seems ironic.

"What we're doing," he told a reporter, "is taking 160 acres to get it out of your streams and rivers." □